









66







# **FOOD DIGEST**

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**National Information Centre for Food Science and Technology**  
**Central Food Technological Research Institute,**  
**Mysore — 570 013, India**







## CONTENTS

1. Raw Materials	...	1
2. Storage and Infestation Control	...	1
3. Food Additives	...	3
4. Processes	...	4
5. Byproducts and Waste Utilization	...	9
6. Processed Products	...	-
7. Equipment and Machinery	...	11
8. Packaging	...	30
9. Analysis	...	33
10. Commercial Intelligence	...	34
11. Food Regulation, Quality Control and Hygiene	...	47
12. Transfer of Technology and New Industries	...	56
13. Personalia	...	59
14. Special Article - Colours in Foods	...	60
Index		







## CONTENTS

1. Raw Materials	...	67
2. Storage and Infestation Control	...	68
3. Food Additives	...	75
4. Processes	...	76
5. Byproducts and Waste Utilization	. .	81
6. Processed Products	...	-
7. Equipment and Machinery	...	84
8. Packaging	...	102
9. Analysis	...	103
10. Commercial Intelligence	...	105
11. Food Regulation, Quality Control and Hygiene	...	118
12. Transfer of Technology and New Industries	...	140
13. Personalia	...	-
14. Special Article - Dietary fibre in Indian diets and its nutritional significance	...	145

Index







## CONTENTS

1.	Raw Materials	...	157
2.	Storage and Infestation Control	...	158
3.	Food Additives	...	161
4.	Processes	...	162
5.	Byproducts and Waste Utilization	...	-
6.	Processed Products	...	166
7.	Equipment and Machinery	...	167
8.	Packaging	...	176
9.	Analysis	...	-
10.	Commercial Intelligence	...	177
11.	Food Regulation, Quality Control and Hygiene	...	193
12.	Transfer of Technology and New Industries	...	201
13.	Personalia	...	202
14.	Special Article - Packaging - Some developments in the technology, materials and applications	...	203

Index







## CONTENTS

1. Raw Materials	...	209
2. Storage and Infestation Control	...	210
3. Food Additives	...	-
4. Processes	...	213
5. Byproducts and Waste Utilization	...	216
6. Processed Products	...	-
7. Equipment and Machinery	...	216
8. Packaging	...	224
9. Analysis	...	226
10. Commercial Intelligence	...	227
11. Food Regulation, Quality Control and Hygiene	...	239
12. Transfer of Technology and New Industries	...	252
13. Personalialia	...	-
14. Special Article - Flexible Packaging of Heat Processed and Frozen Foods	...	255
Index		







## CONTENTS

1.	Raw Materials	...	-
2.	Storage and Infestation Control	...	1
3.	Food Additives	...	-
4.	Processes	...	-
5.	Byproducts and Waste Utilization	...	3
6.	Processed Products	...	-
7.	Equipment and Machinery	...	5
8.	Packaging	...	20
9.	Analysis	...	21
10.	Commercial Intelligence	...	22
11.	Food Regulation, Quality Control and Hygiene	...	32
12.	Transfer of Technology and New Industries	...	40
13.	Personalia	...	-
14.	Special Article - Flexible Packaging of Heat Processed and Frozen Foods	...	41

Index





# CONTENTS

1. Raw Materials	....	45
2. Storage and Infestation Control	....	46
3. Food Additives	....	48
4. Processes	....	50
5. Byproducts and Waste Utilization	....	52
6. Processed Products	....	-
7. Equipment and Machinery	....	53
8. Packaging	....	63
9. Analysis	....	64
10. Commercial Intelligence	....	65
1. Food Regulation, Quality Control & Hygiene	....	86
2. Transfer of Technology & New Industries	....	89
3. Personalia	....	-
4. Special Article	....	92
Nutritional Aspects of Plam Oil		

Index





## CONTENTS

1.	Raw Materials	....	95
2.	Storage and Infestation Control	....	96
3.	Food Additives	....	98
4.	Processes	....	99
5.	Byproducts and Waste Utilization	....	-
6.	Processed Products	....	102
7.	Equipment and Machinery	....	103
8.	Packaging	....	109
9.	Analysis	....	111
10.	Commercial Intelligence	....	112
11.	Food Regulation, Quality Control & Hygiene	....	142
12.	Transfer of Technology & New Industries	....	152
13.	Personalia	....	-
14.	Special Article -		
	The BVO Story	....	153

Index





## RAW MATERIALS

## 1 More mushrooms

Recently the U.S. Department of Agriculture (USDA) gave grants totalling Rs. 1.9 million for two joint Indo-U.S. projects in agriculture.

Under the first project, the Institute for Home Economics of the University of Delhi has received Rs. 1,127,000 to study the viability of cultivation and postharvest technology for mushrooms as an income-generating activity for Indian women. The three-year research project will cover all aspects of mushroom production - from cultivation to marketing.

The Institute of Home Economics has initiated the project in New Mangal Puri, a village on the southern outskirts of New Delhi, where 15 local women will be trained in the cultivation and marketing of button mushrooms. They will also be provided with seeds and other inputs for growing mushrooms. (*Span January 1989, 39*)

## STORAGE AND INFESTATION CONTROL

## 2 System extends life of chilled meats

Storage periods of 10-12 weeks for chilled pork is one achievement of a packaging system developed in New Zealand and now being marketed on a worldwide basis.

Captech was devised by UEB Packaging Ltd. The system consists of a gas flushing machine which evacuates the atmosphere from the bag containing the meat and replaces it with carbon dioxide. The bag itself is produced from an oxygen impermeable laminate and includes an inner wrap which absorbs exudate and provides a bone guard. A polyethylene liner protects the barrier bag from external abrasion



and the entire pack is completed with a corrugated case.

Development of Captech follows a worldwide trend to chilled meat rather than frozen meat which, says UEB, forced the New Zealand meat industry to change its traditional export methods.

According to UEB, existing technology using vacuum packed barrier bags gave chilled meat a realistic storage life of only eight to nine weeks, an insufficient margin to allow for variations in production, sea freighting and distribution to European markets. Air freight is not an economic option.

"Captech enables chilled beef and lamb to store for at least 16 weeks, more than doubling storage time previously guaranteed by other systems.

Mr Higgs added: "Probably one of the most significant benefits is that Captech offers the opportunity to sell very tender meat by using the controlled extended shelf life available which increases tenderness while maintaining meat texture".

*(Packaging News November 1988, 63)*

### Non-toxic pesticide from neem seed

An extract of the seed of the neem tree (a tree indigenous in India) could become a viable natural pesticide, if entomologists at the University of British Columbia and colleagues at Safer Ltd., successfully extend the extract's stability.

The active component azadirachtin, is not a neurotoxin, but acts as anti-feedant and interferes with insect moulting hormones, making it virtually non-toxic for animals.

*(Chemical Weekly 34(14), 1988, 81)*

## FOOD ADDITIVES

## 4 Natural sweetener

A refined natural low-calorie sweetener extracted from the leaves of the herb *Stevia rebaudiana* Bertoni is offered. The Stevia Plant, grown in Paraguay, South America, was originally used by the Guarani Indios for sweetening their drinks. Stevia Sweet is non-calorie sweetener, does not cause tooth decay, is suitable for diabetics and is also 150-300 times sweeter than sugar in the same concentration, it is said. It can be used in low-calorie soft drinks, health food sweets and biscuits, chewing-gums and desserts. Stevia sweetner in powder or liquid form is useful as a food additive or as a tabletop sweetener in granulated and tablet form. The sweetener is easily soluble in water or alcohol, has good ph-stability in a broad range, and is heat stable and stable.

(*Chemical Products Finder* 7(6), 1988, 93)

## 5 A more stable form of VIT-C for food use

Rangen Inc., Buhl, Idaho, USA, has announced the development of 3 more stable form of Vit C. The product will be initially marketed as an additive in fish feed, but it has the potential to extend to the human products market.

This modified Vit C is said not to oxidize because its vulnerable flank is protected by the phosphate molecule that is attached to it. Therefore, the product can be stored, exposed to air, heat and water and last much longer. But when the vitamin enters the body of a fish or human, certain enzymes takes the protective phosphate radical away, forming the vitamin for use.

Paul Sert a professor at Kansas State University developed this stable form of ascorbic acid and the patent is issued by the Kansas State University Research Foundation.

(*Chemical Weekly* 34(14), 1988, 83)



## PROCESSES

## 6 High protein food bars and meatless meat pies

Researchers at Provesta Corporation (a subsidiary of Phillips Petroleum) would like to see everyone munching on a synthetic meal with minimum of cooking time. Last July Provesta has started test marketing its new food bar in USA, made with 'Provesteen', a high protein yeast grown in fermentation tank. The food bar is combined with ingredients such as wheat bran and pineapple and is designed as a meal substitute, rather than a snack.

The race is on to develop food products from these single cell proteins (SCP). Using a similar fermentation technology two British companies, Hanks, Hovis and Macdougall and ICI are producing a material that can assume the texture of beef, chicken - or even potato chips.

The material, a fungus, is then combined with flavourings, spices or fillers to simulate the taste of the desired final product. By enhancing or suppressing the texture, the fungus could resemble a food such as potato chip. Called RHM's protein, it is reported to be high in protein, low in fat, sodium and cholesterol and with a protein superior to soy. RHM's protein was approved for use in Britain in October 1985 and is currently being sold on frozen patties (meat pies).

*(Chemical Weekly 34(18), 1989, 83-84)*

## 7 Alcohol distillation by solar energy

In a pioneering development, scientists at the Nimbkar Agricultural Research Institute (NARI), Phaltan, Maharashtra, have produced industrial alcohol from sweet sorghum with the help of solar energy.

A pilot plant, the first in Asia, capable of producing upto 50 litres of 90 to 95 per cent pure industrial grade alcohol per day and running completely on solar energy has been set up on the NARI campus.

The plant consists of 38 metre-squared flat plate solar collectors and a 2150-litre hot water storage tank. The distillation column is 5.5 metres long.

On an annual basis, 75 per cent of the total energy supplied for distillation comes from solar energy, while the rest is taken care of by using fossil fuel. There is a tremendous saving of fossil fuel, according to NARI Director Dr. Anil K. Rajvanshi. The project has been supported by the Department of Nonconventional Energy Sources.

"Another very innovative feature of the project is the development of complete technology of alcohol production from sweet sorghum", says Dr. Rajvanshi. Sweet sorghum (*Sorghum bicolor* L. (Moench)) is a multipurpose crop; it yields grain from flour from its earhead; the stalks provide sugary juice which can be fermented to yield alcohol; and the bagasse provides fodder for animals. Thus one crop from the same piece of land provides food, fuel and fodder. "No other crop yields all these three things together", said Dr. Rajvanshi.

The scheme for alcohol production from sweet sorghum has been developed so that alcohol can replace kerosene for cooking and lighting. India imports about Rs. 15,000 million worth of kerosene every year and alcohol production from a crop which does not take land away from food production is extremely attractive proposition for the country. Scientists at NARI have also produced efficient lantern and stoves which run on alcohol. Thus the use of alcohol for lighting and cooking has been technically proved. At present NARI is in the process of designing mini-distilleries of 5000 litres per day.

"The potential of alcohol from sweet sorghum to replace kerosene as cooking and lighting energy and also as an automotive fuel is also tremendous" said Dr. Rajvanshi. Thus, if the land which is under cultivation of grain sorghum in Maharashtra is brought under cultivation of sweet sorghum, there will be a yield of 12 million tonnes of grain per year, and 26 billion litres of alcohol per year. This amount of alcohol can completely take care of all the petrol consumption of India for the year 2005 A.D.

(P.T.I. Science Service 8(1), 1989, 2-3)



## 8 Separating alcohol from water

Tokuyama Soda Co. and Katokichi Co. have jointly developed a chitosan based membrane designed to separate high-purity alcohol from water at high efficiency. The membrane calls for smaller amounts of energy - only one-third to half that needed in the case of a conventional evaporation process and facilitates manufacture of compact separation equipment.

The two companies have transformed chitosan derivatives into hollow-fiber membranes and tied together several thousand units of the products, thereby producing a membrane module having a  $2\text{m}^2$ -wide effective area. They have confirmed that the module is capable of filtering only water from a water alcohol mixture at high speed within a wide temperature range covering from room temperature to  $70^\circ\text{C}$ .

They expect the new product to be extensively applied to production of high-purity alcohol, concentration of ethanol, dehydration of mixed organic solvents, recycling of alcohol based solvents and removal of water from bio-reactors, etc.

Prior to development of the new product, Katokichi successfully separated chitin and chitosan from lobster/prawn/shrimp shells and found that the two substances help separate alcohol from water. Tokuyama Soda pioneered a method for producing a membrane therefrom.

(*Chemical Weekly* 34(20), 1989, 111)

## 9 Mushroom based beverage

A Chinese institute offers know-how for manufacturing a nutritious mushrooms-based beverage free of chemical additives.

The process involves the formation of a submerged culture of malt wort, soyabean juice and edible mushroom.

Formulated by Beijing Food Research Institute the beverage contains, among others, the following : amino acids, organic acid, minerals, Vitamins, polysaccharides, ribonucleic acid.

Raw-materials needed are malt wort, soya been and edible mushroom.

To produce 80,000 bottles, each with 250 ml, would require 5,000 kg. of malt wort.

A flat-fee of US \$ 400 000 is required for technology or a payment of US \$ 150 000 and 5 per cent share of profits for 10 years. This includes fees for the formulation, bacteria strain, equipment and training of personnel.

For more information, contact: Beijing Food Research Institute, No.3, Hong-tong Xians Dong-zong-bu Hutong, Beijing China.  
(*Indian Food Packer* 42(5), 1988, 64-65)

## 10 Oil from agricultural residues

Scientists at the Indian Institute of Technology (IIT), Delhi are reported to have developed a process to produce oil from agricultural residues such as straw. The lab scale process developed at the IIT Biochemical Engineering Research Centre (BERC) makes the cells of the yeast "*Rodhoturula giracilis*" use either rice straw or sugarcane molasses to churn out oil. The microbial oil is comparable to palm oil in composition and could be used as a substitute for industrial oils in the country.

The IIT team has estimated the production potential of microbial oil to be about 350 kilograms per hectare from rice straw and 200 kilograms per hectare from sugarcane molasses.

Yeast cells are tiny micro-organisms capable of digesting sugar molecules obtained from rice straw or molasses and producing oil.

The BERC process involves feeding the sugar from the agricultural residues into a device called a bio-reactor that contains a nutrient medium for the yeast. Yeast cells inside the reactor begin to digest the sugar and within a few days start manufacturing the oil.



The cells yield upto 50 per cent of their weight in oil and leave behind nearly 45 per cent of protein-rich cellular matter which can be used as cattle or poultry feed. A cost analysis done at the BERG has indicated that the microbial oil would cost Rs. 13 or Rs. 16 per kilogram depending whether it is extracted from rice straw or molasses bioreactions.

(University News 27(3), 1989, 10)

## 11 Cholesterol-free butter

Active research is in progress for removal of cholesterol from butter fat by employing supercritical CO<sub>2</sub>.

In laboratory scale tests at Supercritical Processing Inc. (SCP), Allentown, Pa), 20% of the cholesterol in butter was removed. SCP sparges supercritical CO<sub>2</sub> at 40°C and 2000-2500 psig into the bottom of a one-litre still pot containing a batch feed. The solvent passes upto a 4 ft packed column, where it is refluxed. The researchers explain that a fraction of the extract is pumped back into the column to obtain higher cholesterol removal (only 15% is extracted in a simple batch process) and that multistaging can increase the amount removed even more. SCP is looking for support to develop the process further.

Another batch process is reported to remove 90% of the cholesterol. This process developed by Phasex Corp (Lawrence, Mass.) in cooperation with the University of Wisconsin (Madison). The process uses supercritical CO<sub>2</sub> at 60-80°C and about 2,200 psi reports Vai Krukonis, the principal researcher. The higher temperature makes for higher selectivity. So far the method has been tested on a laboratory scale, but researchers are planning to scale it up to a few pounds of butter.

(Chemical Weekly 34(14), 1988, 84)

## 2 Sunflower protein for the food industry

A Research team at the Commonwealth Scientific and Industrial Research Organization (CSIRO)'s Division of Food Research in Melbourne has developed and patented a continuous process for extracting protein from sunflower meal. The process could be utilised by the food industry to yield colourless protein powder for use in nutritious new product lines.

The CSIRO division has designed a continuous pilot plant that used counter-current extraction through a number of vats. It can process 80 kg of defatted sunflower-seed meal per hour. The method also involves ultrafiltration to concentrate the protein extract and spray-drying to produce a colourless protein powder.

Scientists at the Division have prepared a number of food products incorporating the protein extract. These include mayonnaise, biscuits and cakes. For some food products, the sunflower protein could replace imported soyabean protein.

A key factor in the commercial potential of the extract is that it is isolated free of colour. The nutritive value of the protein is being evaluated.

*(Beverage and Food World 15(4), 1988, 67)*

## BY-PRODUCTS AND WASTE UTILIZATION

### 13 New machine can process rice bran into cooking oils

A Houston, Texas company and a California firm have unveiled a machine that allows rice bran to be processed into a high-grade cooking oil and a defatted bran for use in baking.

ASI Controls Inc. of Houston and Brady International Inc. of Torrance, described the machine as "revolutionary" because rice bran's present use is primarily as an animal feed.

The machine uses pressure and heat to destroy the enzymes that cause the bran to turn rancid. The companies said this allows recovery of the 19 to 33 per cent of edible oil that can be used



for salad oil or cooking oil. The remaining defatted bran is said to be as good or better than other cereal grains for making cakes, cookies, pastries and breads.

The machine is installed in the bran stream in rice mills. Once stabilized, the bran can be transported by truck ship or barge to an extraction plant.

ASI and Brady International cooperatively developed both the physical parameters of the desk-sized machine plus the electronic controls for it. ASI has 36 machines completed, said ASI President J.E. House, who anticipates that 30 to 50 per month will be shipped out of Houston for the next several years.

• India alone will be able to save at least \$ 1.25 billion a year on imports of edible oil for cooking, according to Dan McPeak, president of Brady International.

There are other systems for stabilizing bran, including parboiling, a technique used to make rice that will cook without sticking. Some Houston mills have used parboiling extensively for years.

An interesting sidelight is that rice bran contains a high level of fiber. Scientists still do not know whether it is as good, or better, than other forms of fiber such as oats for lowering blood cholesterol levels, the researcher said.

(SEA News Circular 11(12), 1988, 38-39)

## PROCESSED PRODUCTS

-Nil-

## EQUIPMENT AND MACHINERY

## 14 Extraction and bottling plant

An Indian public sector company is offering the technology for a semi-automatic plant for extracting, canning or bottling juices from fruits like grapes, apples and pineapples.

According to the National Small Industries Corporation Limited (NSIC), the process is economical.

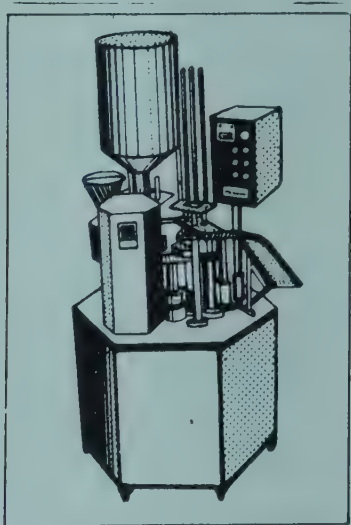
The production and process involves fruit preparation, juice extraction, pasteurisation and processing, and canning or bottling.

NSIC is engaged in promoting and developing small-scale industries. Its services include financing, export, marketing and technical training.

For more information contact: Industrial Advisor, Technology Transfer Division, The National Small Industries Corporation Ltd., Laghu Udyog Bhavan, Okhla Industrial Estate, New Delhi - 110 020. (*Economic and Commercial News* 19(1), 1989, 14)

## 15 Rotary type cup filling machine

Panpack Marketing has developed this automatic machine for accurately filling products from food and pharmaceutical. It



is rotary type cup filling machine and is able to handle different size and shape of plastic cups. It can handle products like ice-cream, jam, honey, fruit juice, yoghurt, oil, cream, shrikhand, soft drink, butter margarine etc. The machine facilitates operation like cup release, filling station, dry nut/top filling,

lid placing, heat sealing, ejecting, etc.

For more details write to: Panpack Marketing, P.O. Box 48, Panchal House, Near Municipality Office, Anand, Gujarat 388 001. (*Chemical Products Finder* 7(8), 1989, 9)



## 16 Automatic filling/packing machine

This packing machine is designed through 100% application of high electronic technique and has special functions such as cartridge system, oilless system and one touch transfer system. It has compact design and can use cheap single unit film of polyethylene, polypropylene, sholex or highgex. It can automatically process filling and packing in desired size from a reel of film, can practice alignment of printed matter by photo electric tube control system. It can be operated with automatic balance, counter and automatic feeding system. It also can be operated in single packing with irregular feeding.

For more details write to: E.M. Singh and Son Pvt Ltd.,  
Sole Agent in India, 1 Crooked Lane, Calcutta 700 069.  
(*Chemical Products Finder* 7(7), 1988, 119)

## 17 Automatic packaging machine for food processing

The 601 Four-Fin Seal Packaging Machine produces high quality pouches that are suitable for liquids, semi-liquids, powders, portion packages of condiments, and granulated products. This automatic form, fill, and seal machine operates at speeds ranging from 50 to 700 packages per minute, depending on the requirements. Its features include accurate heat control, easy to adjust vertical sealers, and positive cutoff and bag release.

For further information write to: Prodo-Pak Corporation,  
77 Commerce St. P.O. Drawer D, Garfield, New Jersey 07026, U.S.A.  
(*Industrial Products Finder* 17(2), 1988, 146)

## 18 Automatic bagging and weighing machines

Mazda International Pvt Ltd manufactures a range of bagging and weighing machines which find applications in grains, animal feeds, solvent extraction plants, fertilisers, chemicals and many other industries. The machines are designed for automatic filling and weighing of materials from a few grams to 100 kilograms. The operating principle is that after the operator fixes the bag on the sack chute

by the mechanical bag clamping device and then starts the machine for feeding operation, the product to be filled flows from the storage bin into the auxiliary hopper of the machine. The weighing scale consists of an equal armed double beam, balanced on knife-edge and 'V' bearings. One end of the beam carries a weight box in which required weights are kept and the other end carries the bag chute to which the empty bag is clamped. When the machine is switched on, the material starts pouring into the bag through the feed gate at a very fast speed. When 90% of the material is fed into the bag, the beam tips cut down the flow of the material to a slow dribble. When the exact quantity of the product to be weighed fills the bag (equivalent to the counter weights in the weight box) the swing gate completely shuts off any further flow of material into the bag. Alternate models for those requiring nett weighing systems are also available. These are suitable for tins and drums also. The filling capacity varies from 2 fills per minute to 15 fills per minute depending upon the product and the model. For models weighing 5 gm to 500 gm filling capacity of 10/14 fills per minute can be achieved. The weight variation is between  $\pm 0.25\%$  and  $0.5\%$  maximum. Also manufactured are belt conveyor systems, screw or slat conveyor systems, bucket elevators, vibratory screws, magnetic separators and portable stackers.

For more details write to: Mazda International Pvt Ltd.,  
79(1) World Trade Centre, Cuffee Parade, Colaba, Bombay 400 005.  
(*Chemical Products Finder 7(7), 1988, 132*)

19

### Weigh and pack systems

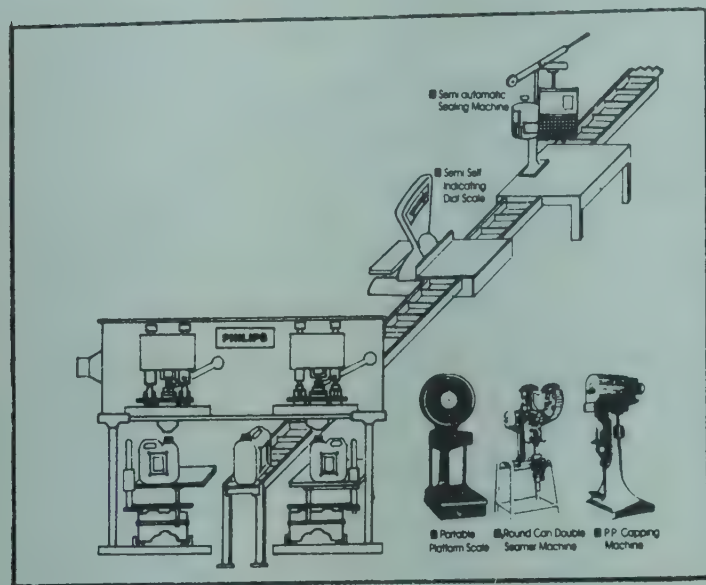
St Joseph Engg Works manufactures Weigh and Pack Systems marketed under the brand name Philips. They are tailor made for continuous packing lines in industries such as vegetable oils, lubricating oils, refineries, chemical pharmaceutical,



food canning, sugar, grains, paints, dyestuff, pesticides, textile, and cold storages. A typically designed Philips Weigh-n-Pack System comprises semi-automatic liquid filling and weighing machine, self indicating scale, capping and sealing machines and

a suitable belt conveyor.

Total systems can be offered as fully automatic with electronic equipment. The company offers systems in capacities from 1,200 containers per hour of 1 kg packs to 400 containers per hour of 15 kg packs. Higher capacities and models are custom engineered to suit specific requirements. The Philip brand product line includes a wide range of



weighing scales, both electronic and manual weighbridges, packing, filling, sealing, seaming and capping machines, and electronic and manual counting scales.

For further information write to: St Joseph Engineering Works, 4/A Manish Commercial Centre, 3rd Floor, 216A Dr Annie Besant Road, Worli, Bombay 400 025.

(Industrial Products Finder Annual 1988, 668)

## 20 Carton over-wrapping and sealing machine

Auto-Wrap A.W. 120 is designed for over-wrapping and sealing of rectangular shaped cartons with cellophane or BOPP film. The film kept in coils are trimmed to the correct size, wrapped over the carton and heat sealed. Maximum power consumption is 2.2 kW. The machine can give 60/120 cartons per minute depending on the size and shape of the cartons. It is suitable for over-wrapping rectangular shaped cartons like those used for toothbrushes, cassettes, blade dispensers, agarbatties, etc. and the types used in pharmaceutical, cosmetic, food and similar industries.

For further information write to: Autopack Machines Pvt Ltd.,  
101-C Poonam Chambers, 1st Floor, Dr. Annie Besant Road, Worli,  
Bombay 400 018.

*(Industrial Products Finder Annual 1988, 251)*

## 21 Rotary sealer

Model RS.16 Automatic Rotary Sealer is designed for sealing inserts and plugs made of LDPE, HDPE, PP, etc., on to bottles of the same material. Bottles are handled through a timing screw and starwheels for smooth movement at high speeds. Temperatures of sealing heads are controlled for effective sealing. The machine can handle bottles of different sizes and shapes and is for leakproof/pilfeproof packing of edible oils, petroleum products, adhesives and variety of products in cosmetics, food, pharmaceutical and pesticide industries. Output of up to 120 bottles/minute is possible.

For further information write to: Autopack Machines Pvt Ltd  
101-C Poonam Chambers, 1st Floor, Dr. Annie Besant Road, Worli,  
Bombay 400 018.

*(Industrial Products Finder Annual 1988, 242)*

## 22 Powder dosing machine

Autopack manufactures semi-automatic powder dosing machine for accurate filling of powder and granules in containers, bottles, pouches, etc with an accuracy up to  $\pm 1\%$ . Filling capacity ranges from 5 gm to 1 kg. Output is up to 30 fills/min. The machine has an electronic counter for accurate fill and easy adjustment of weight. Special stirring system ensures good de-aeration. Power input is 0.75 kW. Fully automatic models with inline coding, cap fixing, etc are also available. The machine is most suitable for filling tooth powder, talcum powder, baby powder, dry syrups, coffee and food, pharmaceutical, chemicals or cosmetic etc in powder form.

For more details write to: Autopack Machines Pvt Ltd,  
101-C Poonam Chambers, 1st Floor, Dr. Annie Besant Road, Worli,  
Bombay 400 018.

*(Chemical Products Finder 7(8), 1989, 92)*



## 23 Automatic plastic bag making machine

Patel Machinery Pvt Ltd has introduced a fully automatic side sealing and cutting machine capable of making LD/LLDEP/HM-HDPE/PP bags in plain as well as printed. The machine has less number of moving parts compared to that of conventional machines. The colour mark scanner fitted on the machine for registration of printed films is extremely sensitive and capable of detecting very low contrasts in colour. Response time of this photocell is so low that there is practically no difference between the speed of the machine for the plain film and printed film. This new film indexing arrangement has micro-processor which controls draw length to the required size. Draw length can be set easily from the panel controls by a thumbwheel switch. This new feature registers the film in the required draw length, hence there is practically no size variation.

For further information write to: Patel Machinery Pvt Ltd., 5/1/1A Phase 1, GIDC, Vatva, Ahmedabad, Gujarat 382 445.  
(*Industrial Products Finder* 17(2), 1988, 46)

## 24 Flexible packaging film for food

Scharr Industries, Inc, manufactures metallized film for packaging food products such as candy, snack foods and coffee. It is said to offer excellent MVTR and O2TR barrier and a light barrier that prevents oxidative rancidity. Its bright foil appearance, high slip, high resistance, and flexibility combine to make it a material that results in attractive laminations.

For further information write to: Scharr Industries, Inc, 40 E, Newberry Road, Bloomfield, Connecticut 06002, U.S.A.  
(*Industrial Products Finder Annual* 1988, 735)

## 25 Beer pump

A magnetically coupled beer pump, claimed to be the first of its kind for beverage dispensing, is offered by a British manufacturer. Maggy (magnetically coupled) from Totton Pumps, is said to be leak proof as it eliminates the normal shaft seals which would wear down and eventually leak. It is, therefore, almost maintenance free. The magnetic drive also allows the pump to be made of taint-free plastics so it is ideal for the food trade, dispensing liquids, especially beer and lagers. It also features a constant delivery of between 0 and 9.1 litre/min with only a slight fall-off at 13.6 litre/min. Compactness is another advantage, with overall dimensions at 187 x 165 x 296 mm. The motor is a permanent split-capacitor induction type, with integral sealed gear drive, and the power source can be either 240 or 110 V single-phase 50/60 Hz.

For more details write to: Totton Pumps Ltd., Southampton Road, Cadnam, Southampton SO4 2NF, U.K.

*(Chemical Products Finder 7(7), 1988, 99)*

## 26 High production slicer/grater

Snack food and cheese processors, as well as bakeries, can get uniform slices, shreds, and granulates with the Urschel Model CC Slicer. Its simple, versatile design enables the processor to change cutting configurations quickly for oval, V-cut, and deep-V slices and shreds. The unit can slice potatoes for chips, shred carrots and cheese for toppings, and granulate nuts and pie crust for bakery goods.

For further information write to: Urschel Laboratories, Inc 2503 Calumet Ave, P.O. Box 2200, Valparaiso, Indiana 46384-2200, U.S.A.

*(Industrial Products Finder Annual 1988, 595)*



## 27 Improved curd beater

Scientists at the National Dairy Research Institute, Karnal have developed an improved curd beater that churns curd for removing the fat.

The new curd beater is of turbine type, having six blades with vertical disposition. Made of aluminium, it is essentially an improved version of the traditional beaters or 'mathani' used in villages, and retains only the bottom paddle of the original unit.

The new curd beater has been found to be far superior in terms of energy consumption, time requirement for churning and cost advantage.

(PTI Science Service 7(23), 1988, 4)

## 28 Industrial drying oven

Yorco Air Drying Oven is used for baking breads and biscuits, drying chemicals medicines etc. It is of double walled construction on a heavy angle iron frame. Inner and outer chambers are made of thick mild steel. Inner chamber is coated with aluminium paint and outer is finished with grey hammertone. The 75 - mm gap between the walls is well insulated with glass-wool. Temperature is controlled by capillary thermostat from 50°C to 250°C  $\pm$  5°C. A heavy duty blower is provided to circulate air inside the chamber. Control panel is fitted on one side with On/Off switch, indicator lamps, and temperature control knob dial thermometer. Adjustable ventilation is provided on top of the roof. The oven is supplied complete with cord and plug to work on 220 V, single phase, or 440 V 3 phase AC supply.

For more details write to: York Scientific Industries, Yorco Chambers, 3A Tak Wadi, Kalbadevi Road, Bombay 400 002.  
(Chemical Products Finder 7(7), 1988, 133)

## 29 Tray dryers

Thermal Airo Electricals offers tray dryers for use in drying foodstuffs. They are available in 12, 24, 48, 96, 150 and 192 tray capacities. Drying is carried out at temperatures from 100°C to 300°C depending upon the type of product to be dried. Trays are made from aluminium sheets, SS or Gl. The dimensions are 813 x 406 x 32 mm. Tubular or strip heaters are used in case of electric heating and finned steam coils are used for steam heating. Uniform temperature is maintained by using suitably rated fans. A temperature controlling thermostat to control the working temperature automatically is provided.

For more details write to: Thermal Alro Electricals, Plot 90/1, GIDC Estate, Vatva, Gujarat 382 445.  
(*Chemical Products Finder* 7(9), 1989, 135)

## 30 The world's first commercial sonic-assisted drying plant

The world's first commercial-scale sonic-assisted drying facility is undergoing trial and has started commercial production in 1988 at Westco Drying Inc. in Desert Hot Springs, California, USA. The plant custom-dries specially cheese and milk powders, vegetable products, such as onions and garlic, and citrus products for other food processors.

Formerly known as 'pulse-combustion drying' sonic-assisted drying combines heat and acoustics to dry viscous products difficult or impossible to dry via conventional spray drying and dries them at temperatures much cooler than conventional methods to reduce product degradation by heat. Product outlet temperature is as low as 90°F compared to 250°F which is typical for conventional spray drying.

Sonic-assisted drying technology was originally developed jointly by US Development Corporation (USDC), Indianapolis, and Purdue University. Continued development of the process on a pilot plant at Purdue has reduced 'sonic effluent' to below the 80 decibel limit mandated for industrial processes by OSHA regulations in USA.



In pilot test at Purdue, the process has successfully dried products ranging from 8 to 76% solids, reports Dr. Jay Marks, professor of food science at Purdue. The USDC has purchased rights to commercialize and license the technology.

One very positive aspect of the Westco Drying Plant is its cost effectiveness. The use of solar and thermal energy from the desert and the sun allows the plant to generate the same temperatures naturally as a conventional plant does mechanically, thereby reducing operating costs.

The retrofitted plant combines sonic-drying and solar-heating technologies plus dry, hot desert air to cut energy costs and boosts drying efficiencies. Solar heat is collected and routed to the plant by seven miles of stainless steel pipes laid out on the desert floor, and by roof-mounted solar heat collectors.

In addition to commercial production, the Westco plant will serve as a pilot facility for commercial scale up and for tuning the process for drying to the degree needed to meet tight product specifications. For products ordinarily subject to burning or caramelization, the plant can adjust outlet temperature to as low as 90°F. By using the above facility of drying, USDC introduced in 1988, Sweet C 42 - high fructose corn syrup dried via the sonic assisted process and encapsulated to prevent hygroscopicity.

For further information contact: Westco Drying Inc, Desert Hot Springs, California, USA.

(*Chemical Weekly* 34(23), 1989, 81-82)

### 31 Drying plants

SSP offers the most modern drying plants for dairy, chemical, food processing and pharmaceutical industries based on advanced technology. Their spray dryers incorporating the latest and most efficient spray nozzle design produce instant powder comparable to the best in the world and gives a lot of flexibility in control of powder quality. Through their development efforts they have successfully designed, fabricated and commissioned the largest vibro fluidised bed dryer in India. The continuous band dryer

designed by them using indigenous technology has got some unique features. They also offer rotary bundle tube and flash dryers which are latest in design and most efficient in performance. Recent collaboration agreement with Swenson Process Inc. USA, a world leader in dryer technology development would upgrade SSP's own technology. They are revamping their R&D Centre completely and installing pilot plants to try out new products before offering any plant to a customer.

For further information write to: Faridabad Stainless and Steel Products Co. Pvt Ltd., 19 DLF Industrial Area, Phase-II, 13/4 Mathura Road, Faridabad, Haryana 121 003.

*(Industrial Products Finder Annual 1988, 145)*

### 32 Grain dryer

The Terminal Grain Dryer efficiently dries corn, wheat, soyabeans, rice, and milo. Easily converted between 50 and 60 cycle power, it operates on natural gas and L1' with optional gas/oil burners. Designed to cut 30 to 40% from a fuel bill, this dryer used double inlet 3650 airfoil centrifugal fans and has state of the art drying controls. It comes in models with capacities ranging from 19 to 95 T/hr.

For further information write to: QED Dryers Sales and Manufacturing, Inc. 4993, 27th Ave, Rockford, Illinois 61109, U.S.A.

*(Industrial Products Finder 17(2), 1988, 163)*

### 33 Continuous solid-liquid separation centrifuge

The Pennwalt Super-D-Canter manufactured in collaboration with Sharples Stokes Division, Pennwalt Corporation, USA, is amongst the finest continuous solid-liquid separation centrifuges and embodies the latest improvements that effectively utilise high centrifugal forces in a rotating bowl to achieve an efficient separation. It has a high capacity/power ratio, is



exceptionally compact, needs little, if any, maintenance or supervision, and gives continuously an effective and reliable separational performance. The general areas of application of the Pennwalt Super-D-Canter are clarification of liquids; dewatering of solids; and wet classification of very fine solids and dewatering of effluent sludges. It can handle a wide variety of slurries in chemical processing, food processing, minerals and allied industrial effluents.

For further information write to: Pennwalt India Limited.,  
507 Kakad Chambers, 132, Dr Annie Besant Road, Worli, Bombay 400018.  
(*Industrial Products Finder Annual 1988, 2*)

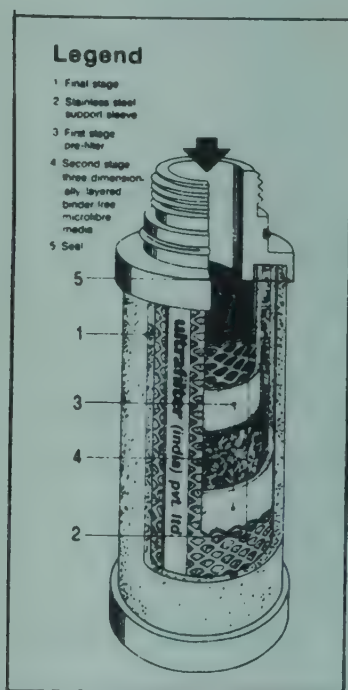
#### 34 Fruit and vegetable sorter

Seven tonnes of potatoes, or similar fruit and vegetable products, can be stored and packed in one hour by an automated system available from Britain. The Autoselector D has been designed to eliminate any human sorting or the need to pre-size items. The system can be programmed to sort and pack fruits and vegetables such as apples, oranges, lemons, tomatoes, sprouts, peppers and onions (and with the manufacturer's conveyor feed system, it can even handle shrimps and prawns). Tubers are fed on to a conveyor where they are rotated while being moved along the belt. Viewed by a television camera and measured by a high speed computer, each item's length, minimum and maximum width and conformity to required shape can be recorded, together with counts, totals and any other information. The system will calculate weight automatically, and as accurately as any individual weight sizer, and will then channel each item separately into six or more designated outlets, according to measurement, weight and acceptability of shape.

For further information write to: Loctronic Graders Ltd.,  
Denbury, Chelmsford, Essex CM3 4NH, U.K.  
(*Industrial Products Finder Annual 1988, 195*)

## 35 Cartridge filters

Ultrafilter (I) Pvt Ltd manufactures, in technical collaboration with Ultrafilter GmbH, a complete range of cartridge filters for the purification of compressed air, gases and liquids. These high efficiency filters, which can trap particles down to 0.01 micron in size, find applications in a wide range of industries - breweries, pharmaceuticals, chemicals, dairies, food processing, etc. Inside this filter, purification takes place in three stages. In the first stage, coarse particles of dirt and pipe scales are trapped by a prefilter as the compressed air flows through the filter element.



In the second stage, the partly filtered air is passed over a three-dimensionally layered microfibre medium where 99.99998% of all oil and water aerosols and dirt particles down to size of 0.01 micron separate, forming bulk liquid. This bulk liquid is carried by the air flow into the outer foam sock where, in the third and final stage of filtration, air and bulk liquid separate, with the latter sinking to the bottom of the filter housing from where it is regularly discharged. Vaporised oil and odours are removed by patented

two-stage activated carbon filters. In food, beverage and pharmaceutical industries, the air is further passed through a sterile filter to ensure 100% sterility. Ultrafilter liquid filters are used to purify liquids, including process water, parenterals and injectibles, to 0.2 micron particle size.

For more details write to: Ultrafilter(India) Pvt Ltd.,  
29/2 KH Road, Bangalore, Karnataka 560 027.  
(Chemical Products Finder 7(7), 1988, 130)



## 36 Filter products for food and beverage industry

Ion Exchange (India) Limited offers a wide range of filter products specifically suited for food and beverage industry. They represent Cuno Pacific Pty Ltd., Australia in India for the fine filtration products. Cuno manufactures the widest range of fine filtration equipment available from any one company. The basic filtration methods used by them include: depth, surface and adsorption filtration. Generally the food and beverage industry requires utilisation of all these three methods. Many beverages just require the efficient filtration of particulates from water. Cuno depth filters, BetaPure, Micro Klean III and Micro Wynd II economically service this requirement for the mains incoming water to the manufacturing plant or individual drink dispensing units and ice makers. Should high flow rates be required then the polypropylene pleated BetaFine or Polypro should be used. The Cuno activated carbon cartridges AP117 are used to remove chlorine or offensive tastes and odours from water. In the beverage industry Zeta Plus serves as a replacement to the hazardous asbestos filter media. The filter media is available to fit all filter presses and is also manufactured in cartridge configuration to fit Cuno fully enclosed, no mess sanitary housings. Cuno's Zetapor Nylon 66 beverage membranes are specifically designed to meet the requirements of beverage industry. The cartridge combines long service life with efficient bacteria, mould and yeast removal. Cuno filter media is steam or hot water sterilisable for many cycles to obtain maximum service life.

For further information write to Ion Exchange (India) Ltd., 10, Bengal Chemical Compound, 502, Veer Savarkar Marg, Prabha-devi, Bombay 400 025.

*(Industrial Products Finder Annual 1988, 267)*

## 37 Meat and sea-foods processing systems

H Maurer + Sohne, West Germany, manufactures a complete range of systems for processing meat and sea foods. Maurer air-conditioned, maturing and smoke house installations can be used, eg. for uncooked sausages, and meat products of any kind; dried sausage and meat products; sausages and meat products with white mould; fish and other sea foods; provisions, delicatessen and fruits.

For further information write to: Thermal Airo Electricals, 90/1, GIDC Estate, Behind Bank of India, Vatva Dist Ahmedabad, Gujarat 382 445.

*(Industrial Products Finder 17(3), 1988, 26)*

## 38 Various systems for use in food/pharmaceutical/chemical industries

Industrial Dynamics Ltd, USA, manufactures various systems whose application covers industries like food, beverages, soft drinks, cosmetics, pharmaceuticals, chemicals, paints, etc. Empty Bottle Inspection System detects presence of foreign matters, residual liquids, chipped finishes, plugged necks, broken heels and scuffed side walls. This prevents costly product waste, helps eliminate product liability problems and promotes line efficiency. Filler and Closure Monitoring and Sampling System monitors filler operation by pinpointing and reporting the source of improperly filled containers, while cutting filler stoppages to the bare minimum. The system also serves as a maintenance support device that warns of impending machine failure and out-of-tolerance operations. In addition, these systems provide data collection and reporting capabilities of analysis of process problems and trends. Full Package Inspection System: inspects fill level, closure, label placement, container integrity and special package features. This system provides an early warning of defective products for fast correction and can keep improperly filled containers from interrupting production. Case Inspection



System: rejects missing, empty, broken and high packages in closed or open cases. Inspections include leading and trailing flaps, along with protruding side flap inspection. This system's micro-processors delivers production and quality control data as well as self diagnostics for easy maintenance. Hence this system enhances production efficiency, reduces labour cost, cuts down on pilferages and prevents the distribution of incomplete or defective cases. Rejection System is compatible with high speed inspection equipment and will operate on fixed or variable speed production lines.

For more details write to: Pentax Engineering Pvt Ltd.,  
Bharat Velvet Compound, Safed Pool, Sir MV Road, Andheri (East),  
Bombay 400 072.

*(Chemical Products Finder 7(9), 1989, 76)*

### 39 Food processing systems

Stork Titan bv Holland, a part of the worldwide Stork group of companies, manufactures a wide range of Food Processing Systems and Equipment. The range of equipment comprises extremely durable and highly versatile systems for forming, portioning, flouring, battering, breading, tempering and frying, as well as conveying and cooling systems in various capacities for meat, fish, potato and vegetable based convenience foods. Basically these systems cater to the processing of meat, poultry, fish hamburgers, croquettes, snacks, chips, crisps, peanuts and other similar products.

For further information write to: K Pack Systems, 17/B,  
Horniman Circle, 3rd Floor, Dena Bank Bldg, Bombay 400 001.

*(Industrial Products Finder 17(4), 1989, 180)*

### 40 Unique bearing material for food processing

Extensive research, development, and testing have produced RULON 641, a new self lubricated bearing material. Made solely from Food and Drug Administration-cleared materials, it is said to be suitable for food, drug, and dairy processing applications.

It is a nonabrasive and compatible with a variety of mating surfaces, including mild steel and types 303 and 316 stainless steel. Featuring a low coefficient of friction, this material was designed to replace brass, bronze, and carbon bearings.

For further information write to: Dixon Industries Corporation, 386 Metacom Ave, Bristol, Rhode Island 02809, U.S.A.  
(*Industrial Products Finder Annual 1988, 449*)

#### 41 Extrusion equipment

Age Technologies Pvt Ltd has introduced a complete range of indigenously developed equipment for snack and pet food extrusion to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present and modify or sterilise by-products and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function, thus eliminating the capital and operating costs of boilers and driers. Auxiliary equipment is also available to clean and mix raw materials, cool extruded products, apply flavour, and to facilitate material handling.

For more details write to: Age Technologies Pvt Ltd., 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.  
(*Chemical Products Finder 7(9), 1989, 105*)

#### 42 Molecular distillation plants

AVC designs and manufactures molecular high vacuum distillation plants for critical molecular separation requirements in the processing industries. Available in two types, viz, wiped film type and centrifugal molecular type, they are suitable for process vacuum up to  $10^{-4}$  mm and dry vacuum of  $10^{-6}$  mm. The operating principle is as follows. A thin film of the liquid



(film thickness 0.01 mm or less) is formed by mechanical means and heat and vacuum are applied simultaneously. The heat exposure time remains less than a minute and the distillation takes place. The evaporated material is condensed with a centralised condenser and collected separately. Typical applications are for heat sensitive products where high level of purity is achieved without affecting the original product characteristics or flavour. The plant is ideal for perfumery and flavour industries, vitamins manufacturing, solvent recovery, food processing, etc. Any highly heat sensitive chemicals can be processed at low temperature and high vacuum. AVC molecular distillation plants are available from 2 LPM lab scale models to 800 LPM industrial models. Larger capacities can be custom engineered for specific applications. Materials of construction include SS 304 and 316, titanium, tantalum, and Hastelloy. AVC offers specialised technology for high vacuum processing.

For further information write to: Atomic Vacuum Company,  
Post Box 8332, Deonar, Bombay 400 088.  
(*Industrial Products Finder* 17(2), 1988, 48)

#### 43 Tapioca peeler

The Tamil Nadu Agricultural University has developed a machine for peeling the cork layer of tapioca tubers. Developed by the post harvest technology scheme of the department of agricultural processing, college of agricultural engineering, the power driven machine consists of a rotor of 25 cm diameter and 30 cm in length. Cutting blades have been mounted along the circumference of the rotor with a blade angle of 50 degrees.

Driven by a one HP electric motor it peels nine quintals of tubers in hour. Peeling efficiency is 85 per cent and starch loss is 4.5 per cent. The cost of peeling works out to Rs. 1.50 a quintal as against Rs. 12 by the conventional manual method. The cost of the unit is Rs. 3,500.

(*The Economic Times* 20 January 1989, 10)

## 44 Cherry pitter.

An Indian manufacturer of food processing equipment and machinery offers a manual cherry pitter. The machine from Gardeners Corporation has a capacity of 50-60 kg per hour. It is priced at USD 480 per unit.

It has exported to African countries, Bangladesh, Burma, Mauritius and Nepal.

For further information, contact: S. Narang, Partner, Gardens Corporation, 6, Doctor's Lane, Post Box No. 299, New Delhi 110 001. India.

(*Indian Food Packer* 42(5), 1988, 62)

## 45 Pre heating tanks.

An Indian Company offers a tank used for pre-heating liquids in the food processing industry. It has a capacity of 66 litres. Manufactured by Gardners Corporation, the tank comes in two models, one that is electrically-heated and the other, steam-heated.

It is rectangular and made of heavy guage mild steel in welded construction. It is painted with heat-resistant enamel. The electrically-heated tank is provided with a thermostat, drain socket, short legs, water inlet and overflow sockets and is insulated with glass wool from outside.

The electrically-heated tank costs about USD 700 per unit. The steam-heated tank without insulation costs about USD 502.

(*Indian Food Packer* 42(5), 1988, 62)



## PACKAGING

## 46 Corrugated boxes from cotton stalks

Cotton stalks are emerging as a non-conventional raw material for the manufacture of corrugated boxes used in the packaging of fruits and vegetables.

Wooden boxes and corrugated cartons have been found to be the most suitable for packaging of fruits and vegetables, especially in terms of storability and suitability for long-term transportation. They minimise ripening loss in weight and decay of the packed products, thereby substantially reducing post-harvest losses of fruits and vegetables, which have been estimated to be Rs 20 million annually.

Between the two, corrugated boxes are a better packaging medium, especially because of their light weight, but their use is inhibited by the high cost of manufacture. The Cotton Technological Research Laboratory, Bombay has now evolved a cheap method for making corrugated boxes of various dimensions from cotton plant stalks.

An estimated 15 million tonnes of cotton plant stalks are generated annually in the country. At present, they are not used for any commercial purpose, except as a fuel by rural people, while a bulk of it is disposed off by burning in the fields.

Dry cotton plant stalk was mechanically cut into small chips, 2 to 3 cms in size, and soda and kraft pulps prepared from them using 14 per cent sodium hydroxide and 16 per cent kraft paper liquor (sodium hydroxide and sodium sulphide). The pulps were then used to prepare large-sized hand-made paper which was in turn used to make corrugated boards and boxes.

The cost of manufacture of these corrugated boxes will be lesser than that of boxes made from the raw materials, as the cotton stalk is a renewable resource, which is grown every year and available in plenty at a very low price. The use

of cotton plant stalks as a raw material would also entitle manufacturers of the excise rebate which is given to industries using agro wastes, the report says.

(*P.T.I. Science Service* 8(1), 1989, 3)

47 Easy-to-open retortable container know-how to U.S.

Idemitsu Petrochemical Co. has licensed the know-how on manufacture of its easily peelable plastic retortable container ("Magictop") for foodstuffs to Sonoco Products Co. (U.S.). The agreement provides the U.S. firm with nonexclusive rights for use of the know-how in North America (U.S., Canada and Mexico).

The Magictop container is said to satisfy the conflicting requirements for retortable food containers -- one is the tight sealing that can withstand application of high temperature for sterilization of the contents obliged under the law and the other is ease of opening the container when taking the contents therefrom. How to cope with these incompatible requirements has been a problem for the world's makers of retortable plastic food containers.

Idemitsu achieved a breakthrough in 1986 through successful combination of its own technology for making peelable multilayer plastic sheets and its technique for producing an appropriate notch on the flange of a container.

(*Chemical Weekly* 34(20), 1989, 111)

48 Plan to make jute boxes for packing fruits

A specific plan is to be drawn up for the commercial manufacture of jute boxes of packing apples and other fruits instead of the traditional plywood chests. This is being done as the response from apple growing states like Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh, which carried out experiments with jute boxes, has been encouraging.



A meeting comprising laminators, who are manufacturing plywood boxes, manufacturers of cardboard boxes located around Delhi and Calcutta was held in Delhi on October 14.

Representatives of the Indian Institute of Packaging, Indian Jute Research Association and Jute Manufactures Development Council attended the meeting and explained technical details to manufacturers of plywood chests and cardboard.

The aim of this meeting was to increase the use of jute boxes for packing apples and other fruits to save wood.

Under the internal marketing assistance scheme, entrepreneurs showing interest in commercial manufacturing and marketing of jute boxes will be given subsidy for a period of three years to popularise these boxes in fruit growing states.

Interestingly, Bhadrachalam Paper Board Ltd., located in Andhra Pradesh, has shown interest in utilising raw jute and jute sticks for converting into high grade quality paper and its bags. It has urged the ministry of textiles to give concessions and financial reliefs as are given to sugar mills which supply bagasse to the paper industry.

In view of the scarce forest resources, the ministry of textiles has been exploring the possibility of switching over to jute bags for packing apples and other fruits. Its efforts are yielding encouraging results as interest has been shown by apple producing states in using jute boxes instead of plywood chests. The market subsidy to be given for three years is expected to enthuse entrepreneurs to manufacture jute boxes, official sources say.

*(Beverage and Food World 15(4), 1988, 68,70)*

## Electronic fruit

They aren't edible and never will be, but they exist to ensure that the fruit and vegetables that you do eat are the best quality possible.

The electronic fruit were developed by engineers Bernie Tennes and Roland Zapp of Michigan State University.

The American imitation, is an 8 cm sphere of beeswax, containing a tiny clock, an accelerometer, a microprocessor and a battery. The accelerometer records the severity of the bumps which a small fruit, such as an apple, sustains on its journey from tree to shelf. The microprocessor records those bumps which were severe enough to cause a bruise, while the clock notes the time of occurrence. The data recorded in the ersatz fruit is fed into a computer for study.

Tennes and Zapp, in collaboration with the US Department of Agriculture, tested four electronic fruits on 15 apple grading and packing lines, where the fruits were washed, waxed, dried, sorted and bagged, within just 10 to 15 minutes. The fake fruit helped pin-point the exact stages at which the real apples were likely to be damaged. This information was used to improve the machinery used in processing lines. Padded conveyor belts, additional ramps and modified drop heights helped reduce the damage caused.

In another study, the electronic imitation was packed with real apples and test driven 48 to 580 km to test how effectively various packing materials protected the apples during transportation. The cell pack, a foam container housing each apple in an individual compartment, proved to be the best. An improved electronic fruit, incorporating a temperature-sensing device is planned.

*(Science Today December 1988, 29-30)*

## ANALYSIS

### 50 Liquid sampler

The accurate, automatic sampler from Sonford Samplers, USA, can monitor composition of various liquids, including water, effluent, foods and beverages, pharmaceuticals, chemicals, paints, and petroleum products. The air operated sampler arms take representative samples for analysis. Continuous flow



in reservoir keeps the solids suspended to give true composite samples. Programmable microprocessor operates the sampler without supervision. The samples can be obtained at preset times or by proportion to flow. In the sampling cycle sampler arm extends into liquid, retracts, and empties cup contents into funnel to refrigerated storage compartment. The arm can hold various sizes and styles of cups for different sampling requirements.

For further information write to: Sonford Samplers, 905 N 5th Street, Minneapolis, MN 55401, U.S.A.

(*Industrial Products Finder Annual 1988, 365*)

## COMMERCIAL INTELLIGENCE

### PRODUCTION (Raw Material)

51 All-India final estimate of production 1986-87

Production in '000 tonnes

	Potato	Onion	Sweet Potato	Tapioca	Banana
1	2	3	4	5	6
Andhra Pradesh	1.3	147.0	16.7	15.2	356.5
Assam	337.7	11.4	28.6	7.5	391.4
Bihar	1334.5	126.8	330.0	-	59.6
Gujarat	253.6	477.7	20.8	-	546.2
Haryana	131.5	43.3	4.1	-	-
Himachal Pradesh	37.8	0.8	-	-	-
Jammu & Kashmir	3.1	0.8	-	-	-
Karnataka	222.7	183.6	46.6	14.6	94.0
Kerala	-	1.6	40.3	2576.1	328.8
Madhya Pradesh	333.7	151.3	39.5	-	197.9
Maharashtra	51.9	600.2	79.5	-	1379.3
Manipur	20.9	-	0.3	-	29.2
Meghalaya	149.5	-	12.7	23.6	52.4
Nagaland	6.8	0.2	0.5	0.6	-
Orissa	96.7	382.1	443.7	-	194.2
Punjab	251.5	27.6	2.2	-	-
Rajasthan	9.8	57.0	2.6	0.5	-
Sikkim	26.4	-	-	-	-
Tamil Nadu	98.6	158.2	16.2	913.6	911.6

Contd...

1	2	3	4	5	6
Tripura	40.2	0.2	13.0	2.2	19.9
Uttar Pradesh	5757.9	349.1	350.8	-	9.9
West Bengal	3542.6	-	-	-	-
Arunachal Pradesh	20.7	-	1.4	10.0	7.2
Mizoram	0.8	-	2.1	0.5	6.0
Delhi	1.2	0.5	0.1	-	-
Pondicherry	-	0.2	0.4	9.8	3.4
Andaman & Nicobar Islands	-	-	0.8	0.7	17.6
Lakshadweep					2.6
All-India	12731.4	2719.6	1452.9	3574.9	4607.7

(Agricultural Situation in India, June 1988, 267-270)

52 All India final estimate of coconut production, 1986-87  
(Production in Million / nuts)

Andhra Pradesh	198.8
Assam	54.3
Goa	106.3
Karnataka	1,072.4
Kerala	3,068.0
Maharashtra	81.2
Orissa	134.9
Tamil Nadu	1,423.3
Tripura	2.1
West Bengal	186.6
Andaman & Nicobar Islands	33.8
Lakshadweep	24.6
Pondicherry	18.1

All India 6,404.4

(Agricultural Situation in India June 1988, 270)



(Production in '000 tonnes)

	Groundnut	Sesamum	Rapeseed & Mustard	Niger- seed	Safflower	Sun- flower	Soybean
Andhra Pradesh	1,346.4	28.5	0.3	3.7	9.7	28.7	-
Assam	-	6.9	149.0	-	-	-	-
Bihar	4.9	6.8	57.3	13.5	0.2	0.1	-
Gujarat	1,291.7	12.4	234.9	-	-	-	6.0
Haryana	7.8	2.4	216.0	-	-	-	-
Himachal Pradesh	0.4	1.7	1.1	-	-	-	0.1
Jammu & Kashmir	1.4	6.9	54.0	-	-	-	-
Karnataka	894.0	40.0	1.1	9.3	123.0	309.0	-
Kerala	6.1	3.3	-	-	-	-	-
Madhya Pradesh	192.0	20.7	202.0	32.1	0.3	-	645.5
Maharashtra	435.2	49.3	1.0	10.8	197.5	83.6	-
Manipur	-	0.2	2.7	-	-	-	-
Meghalaya	-	0.6	4.5	-	-	-	0.8
Nagaland	0.7	0.8	8.9	-	-	-	0.6
Orissa	496.0	134.5	64.4	60.5	1.9	0.3	-
Punjab	42.0	5.8	118.0	-	-	-	-
Rajasthan	130.5	7.0	691.3	-	-	0.4	39.2
Sikkim	-	-	5.4	-	-	-	6.0
Tamil Nadu	1,077.7	36.1	0.1	-	-	16.9	-
Tripura	0.8	1.0	2.4	-	-	-	-
Uttar Pradesh	112.8	13.8	629.5	-	-	1.9	135.5
West Bengal	14.3	62.5	176.9	2.1	-	0.8	0.3
Arunachal Pradesh	-	0.4	13.8	-	-	-	1.3
Delhi	-	-	0.2	-	-	-	-
Mizoram	-	1.4	-	-	-	-	-
Pondicherry	4.8	0.2	-	-	-	-	-
Dadra & Nagar Haveli	-	-	-	0.1	-	-	-
All-India	6,059.5	443.2	2,634.8	132.1	332.6	435.7	835.3

(Agricultural Situation in India, May 1988, 186-192)

## 54 All India final estimate of spices production 1986-87

(Production in '000 tonnes)

	Carda- mom	Corian- der	Black pepper	Ginger	Chillies	Garlic	Turmeric
Andhra Pradesh	-	23.6	-	3.26	293.1	2.0	127.4
Assam	-	-	-	-	6.5	-	5.4
Bihar	-	3.4	-	0.84	9.3	5.7	6.9
Gujarat	-	-	-	0.44	10.8	13.4	-
Haryana	-	0.1	-	-	12.1	10.4	-
Himachal Pradesh	-	-	-	0.85	0.1	-	-
Jammu & Kashmir	-	-	-	-	0.5	0.1	-
Karnataka	1.62	2.3	0.67	2.92	176.6	2.0	18.5
Kerala	3.09	-	31.94	43.60	0.9	-	6.2
Madhya Pradesh	-	10.9	-	4.10	11.0	58.0	0.4
Maharashtra	-	-	-	0.54	68.4	29.6	9.1
Manipur	-	-	-	0.83	2.1	-	-
Meghalaya	-	-	-	23.35	1.1	-	1.6
Nagaland	-	-	-	2.85	0.2	0.6	-
Orissa	-	8.4	-	6.86	63.4	56.5	27.7
Punjab	-	-	-	-	9.0	2.8	-
Rajasthan	-	102.4	-	0.51	31.8	3.3	0.4
Sikkim	3.90	-	-	10.90	-	-	-
Tamil Nadu	0.54	13.7	0.23	1.07	32.2	1.7	64.6
Tripura	-	-	-	1.18	0.7	-	1.7
Uttar Pradesh	-	2.2	-	5.79	19.6	19.9	0.6
West Bengal	0.58	-	-	7.02	26.4	-	9.6
Arunachal Pradesh	-	-	-	3.60	0.7	-	0.5
Delhi	-	-	-	-	0.2	-	-
Mizoram	-	-	-	6.49	3.2	-	-
Pondicherry	-	-	0.01	-	0.1	-	-
All India	9.73	167.0	32.85	127.00	780.00	206.0	280.6

(Agricultural Situation in India, June 1988, 273-276)

## EXPORTS

## 55 New export norms for bajra and jowar

The public notice relating to the export was issued by the Chief Controller of Imports and Exports on December 1. Under the special procedure, the ceiling for export of bajra and jowar will be placed at the disposal of the Agricultural and Processed Food Products Export Development Authority (APEDA).



Exports will be allowed on the basis of first come, first served basis against the contracts backed by 100 per cent irrevocable letter of credit. Exporters while applying to APEDA would also submit a bank guarantee equivalent to one per cent of the FOB value as per irrevocable letter of credit.

*(Economic & Commercial News 18(53), 1988, 9)*

## 56 Molasses exports to be allowed in 1989-90

The government would permit export of molasses and alcohol in the next financial year also in view of their surplus position. Union industry minister J. Vengala Rao announced here today, reports UNI.

He said foreign exchange earnings from export of these items was likely to exceed Rs. 50 crores next year.

The quantities to be permitted for export would depend on surpluses to be indicated by various states.

The government has authorised export of ten lakh tonnes of molasses and one lakh tonnes of alcohol in the current financial year. However, the actual exports so far had been only 7000 tonnes of alcohol and 50,000 tonnes of molasses, he pointed out. He hoped that exports would be stepped up in the coming months.

Mr Rao said another problem faced by this sector is the poor lifting of both molasses and alcohol by the deficit states, based on allocations made by the industry ministry.

Highlighting the problem created by the surplus states unwilling to allot these to deficit states for distillation, Mr. Rao urged Uttar Pradesh and other surplus states to offer their surplus stocks freely for all purposes and assured that the Centre would make the allocations to the deficit states based on their needs.

*(The Economic Times 3 February 1989, 1, 6)*

## 57 Sesame seed export allowed

The Union government has allowed export of sesame seed under the open general licence (OGL), subject to registration of contracts with the Indian Oils and Produce Exporters Association (IOPFA).

This is the first time in more than a decade that the private trade has been allowed to export sesame seed from the country.

The sesame seed production in the country during the year 1988-89 oil year is estimated at around 6,00,000 tonnes (4,00,000 tonnes kharif and 2,00,000 tonnes rabi) against 3,00,000 tonnes for the last season.

IOPEA has made a detailed study on the export possibilities for various oilseeds and has identified Japan as a major market, followed by the US, West Europe and Middle East countries, Singapore and Hong Kong. Japan imports around 1,00,000 tonnes of sesame seed annually. China is a major competitor in the market.

*(Economic and Commercial News 18(48), 1988, 8)*

## 58 Processed food exports: Thrust areas spotted

The PHD Chamber of Commerce and industry (PHDCCI) has identified a number of thrust areas to achieve a near 40 per cent export growth per annum in processed food and agro-based products over the next three-four years.

The thrust areas identified are meat, eggs (poultry), milk-based products, honey, herbal products, flowers, rice (basmati and non-basmati), alcoholic and other beverages, vegetables, fruits, pickles and papad.

Describing the Government stipulation of zero waste of imported packaging material as an impracticable situation, Mr. Sabharwal has called upon the authorities to incorporate a provision for permitting wastages in the use of packaging material. This is in view of some wastage in any process of manufacture which is bound to occur, according to Mr. Sabharwal.



He has also asked the Government to allow duty-free import of packaging material as well as machinery to enable Indian Exporters meet the international standards of packaging, which is a crucial element in marketing. In this regard, he has pleaded that the provision of duty-free Rep. licences should be restored.

The chamber has stressed on the need for expansion and addition of air cargo space as exporters inconvenienced due to inadequate cargo space in the national carriers.

(*Financial Express* 5 January 1989, 5)

## 59 Marine products to be exported in value-added form to US

For the first time Indian marine products are to be priced in value-added forms in India itself for marketing in the United States as per an agreement reached by a leading US importer with two Indian seafood firms reports PTI.

The US firm, Shore Group, a leading importer of Indian marine products and the two Indian sea food exporting firms, Chemmeens and Rubien, based in Cochin have formed a consortium for the purpose which would very soon start production of value added products for export to the US.

Under the agreement, the whole marketing investment for these products in the US would be made by the US firm which had also plans to start joint ventures with Indian companies for processing and packaging of marine products in value-added forms, Mr. Noel Blackman, president and director of the Shore Group told PTI here today.

Mr. Blackman said at present Indian marine products were being imported to the US in bulk and the entire retail packaging was being done in the US. "The products thus marketed in the US never bear the name of India and the US consumers never come to know that the products are from India", he said.

He said the very purpose of the consortium was to give a boost to Indian seafood products in the US. Indian products would be marketed as products of India once the consortium started its operations.

He said Indian seafood items were of very high quality and it would fetch a very high price if exported in value-added forms rather than in bulk.

Mr. Blackman said in two years time the consortium would be expanded by involving at least 20 more Indian exporters in different parts of the country.

*(The Economic Times 16 February 1989, 1)*

## 60 Japan shrimp market

India will have to soon write off Japan as the major importer of its marine products, specially shrimps.

Going by the trend noticed in recent years, the country may, over the next decade, figure nowhere in the Japanese market which it dominated for long. It has been steadily pushed out by countries like Taiwan, China, Indonesia, the Philippines and Thailand.

It is learnt that the Marine Products Export Development Authority (MPEDA) has projected India's share in the Japanese market to fall well below 10 per cent in 1990. It was as high as 35 per cent till not long ago.

This does not mean that Japan is importing less shrimp these days. Far from it, Imports have gone up from 1.51 lakh tonnes in 1982 to 2.8 lakh tonnes last year. It is just that Indian exports have fallen into the trough in the meantime, from 40,000 tonnes in 1982 to 32,000 tonnes in 1988.

All along the other countries have been adding considerably to their share of the market, banking on their 'cultured shrimps'. In the forefront is Taiwan which logged 35,000 tonnes in 1988 against less than a thousand tonnes seven years ago. China did it from the proverbial 'scratch' to 30,000 tonnes over the same period. The Philippines, Indonesia and Thailand have also been not far behind.

On the other hand, India's export of cultured shrimps to Japan has been stagnating around mere 3000 tonnes. This is the main factor that has affected India's competitiveness in the market vis-a-vis other countries.

*(Financial Express 7 January 1989, 1)*



## IMPORTS

## 61 Import of cloves removed from OGL

The Ministry of Commerce, in a recent modification, had decided that cloves and cinnamon/cassia which were so far allowed for import by all persons under Open General Licence (OGL) for stock and sale purposes, will now be permitted for import only against licences. The licences will be granted to all those who have imported these items during the current year or in any of the last five years. Actual users who have no past imports will also be eligible for licence. Applications for grant of import licence are to be made to the licensing authority concerned.

(*Economic and Commercial News* 18(51), 1988, 13)

## TRADE INFORMATION

## 62 Saffron output

About 5,000 kg of saffron worth Rs. eight crores has been produced in the Kashmir Valley during the current year, an official release said, reports PTI.

Due to its increasing demand, its cultivation has been extended to many parts of the valley including Badgam, Lar, Kulatilbagh and Tappar.

(*The Economic Times* 4 December 1988, 8)

## 63 Food processing: co-ops planned in rural areas

Co-operatives will be formed in rural areas for collection of raw materials for food processing industries. This will effect a direct link between the producer and the processor.

This was disclosed here today by Mr P. Murari, who relinquished the charge of secretary in the food processing ministry to take over as secretary in the ministry for information and broadcasting, while inaugurating a workshop on post-harvest technology of fruits and vegetables organised by the Indian Agricultural Institute.

Mr. Murari said that the ministry for food processing industries had interacted with state government and each state government was identifying a nodal agency for development of horticulture.

He said that regarding post-harvest technology, the country faced numerous problems like transport, storage and handling. The problem was compounded by the inadequacy of a network of rural link roads to permit transportation of crops from the growing areas to the consuming centres, lack of linkages between the grower and the industry, the ubiquitous presence of the middleman in the shape of the loan shark which provided the monetary and other inputs, the commission agents who wanted to make a fast without any investment.

Mr. Murari laid stress on utilisation of waste products from the food processing industry. He said that many items now considered waste products had major utility value. It is also worth examining whether we can produce cattlefeed from such waste, he said. (*The Economic Times* 21 February 1989, 4)

#### 64 Priority status for food processing industry

The food processing industry today got a boost with the Government including it and packaging for this industry under Appendix 1 of the Industrial Policy Statement and bringing the fruit and vegetable products and other processed foods under the broadbanding scheme.

Inclusion in Appendix 1 implies priority status and the industry is open to MRTP firms. Milk foods, malted foods and flour industry and items reserved for small scale sector will however, not come under this.

The official notification stated that all food processing industries other than milk foods, malted foods and flour, but excluding the items reserved for the small-scale sector and all items of packaging for food processing industries, excluding items reserved for the small-scale sector, have been included in the list of Appendix 1 industries.

(*The Hindu* 29 December 1988, 7)



## 65 Milk products licenses issued

The government has issued 13 letters of intent to public cooperative sector units under the new guidelines for the manufacture of milk products and malted milk products.

Mr. Jagdish Tytler, Union minister for food processing industries, said that the new guidelines have been accorded the highest priority to cooperative and public sectors for future installation of capacity.

(*The Economic Times* 16 February 1989, 7)

## 66 Industrial R&amp;D expenditure 'inadequate'

The total research and development (R and D) expenditure in the industrial sector at 19 per cent of the national R and D expenditure is inadequate and has not made any significant contribution in raising the level of productivity.

In a study undertaken by the Federation of Indian Chambers of Commerce and Industry (FICCI) on "productivity, technology and research and development," it is maintained that whatever insignificant productivity increases recorded in certain segments of the society was mainly due to technology upgradation through imports of machinery and equipment.

The FICCI study points out that the share of private<sup>2</sup> sector in the total industrial R and D declined marginally from 57.7 per cent in 1984-85 to 57.3 per cent in 1986-87. Over the same period public and joint sector share increased from 42.3 per cent to 42.7 per cent. In absolute terms, in 1986-87, the public sector has spent Rs. 237.06 crores in R and D against Rs. 198.62 crores in 1985-86. The private sector's expenditure grew from Rs. 251.94 crores in 1985-86 to Rs. 318.11 crores in 1986-87.

According to the study, expenditure on R and D and other related science and technology activities as a percentage of the gross national product has risen from 0.96 per cent in 1985-86 to 1.10 per cent in 1986-87.

This, according to FICCI, is insignificant in comparison to ratios of R and D to GNP in countries like the US, Japan, France, Italy and others where it is over two per cent.

(*Financial Express* 14 December 1988, 12)

## 67 Vanaspati price control goes

The vanaspati price control will be off from December 1, 1988 following the government decision to stop supply of imported oil at concessional rate to vanaspati industry.

The agreement for voluntary price control on vanaspati was reached between the government and the industry in August 1987 under which the industry was asked to supply its product at a maximum rate of Rs. 335 per tin of 15 kg. The price was revised upward to Rs 350 a few months ago when the oil supply at concessional rate was reduced to 40 per cent.

At present, the government was supplying 40 per cent of the industry's oil requirement at a concessional price of Rs. 15,000 per tonne, while the industry had an option to meet its another 40 per cent need at an open window rate of Rs. 19,000 per tonne. Now, the government has decided to stop concessional supply fully with a view to reduce dependance on oil imports in view of the expectation of a bumper oilseeds production in the country.

The vanaspati production had gone up substantially to around 10 lakh tonnes during 1987-88 oil year as a result of assured oil supplies at fixed prices, and the demand was also good in view of the higher market prices of edible oils. Now the demand for vanaspati, is expected to shrink.

*(The Economic Times 1 December 1988, 1)*

## 68 Domestic expeller oils for vanaspati

Use of indigenous expeller oils of groundnut, mustard and sesame, for the manufacture of vanaspati, has been permitted, subject to a ceiling of 20 per cent.

This major change in the policy has been effective from January 7, official sources said.

Use of expeller groundnut oil is being permitted for the manufacture of vanaspati, for the first time this decade. The ban of the use of expeller and solvent refined groundnut oil was imposed in 1977-78.

The policy has been changed as the oilseeds crop has been very good this year.

*(Financial Express 11 January 1989, 1)*



## 69 Cashew bodies sign MoU

A memorandum of understanding (MoU) for close cooperation was signed here on Friday among Cashew Corporation of India (A subsidiary of the State Trading Corporation of India Limited) and Kerala State Cashew Development Corporation (KSCDC) and the Kerala State Cashew Workers' Apex Industrial Co-operative Society Limited (Capex).

The MoU envisaged close coordination between CCI and the two state government organisations. CCI will provide foreign market intelligence on cashew kernels to KSCDC and Capex with the help of STO's net-work of offices in foreign countries, according to an official press release here.

*(The Economic Times 8 January 1989, 10)*

## 70 Fresh capacity for beer allowed

The Government today announced its decision to permit creation of fresh capacity for the manufacture of beer.

An official release said today that the Government took the decision after reviewing its licensing policy in this respect.

The release said that the Government had banned the creation of additional capacity or expansion of existing capacities for distillation or brewing of alcoholic drinks, except in 100 per cent export oriented units, following the introduction of prohibition in the States.

Licences will be considered subject to the following conditions:

1. No licence will be granted to MRTP/FERA companies for creation of new capacities or for substantial expansion of existing capacities, unless the undertaking assumes the prescribed export obligation.

2. Each unit will be licensed for a minimum capacity of 50,000 kilo litres per annum.

3. There will be no recourse to public financial institution for implementation of the project.

4. The undertaking will not be located in tribal areas and,

5. As far as possible, new units will be dispersed amongst the different regions of the country.

The government reviewed its earlier licensing policy and decided to permit creation of fresh capacity for the manufacture of beer, the release said.

The government reviewed its earlier licensing policy and decided to permit creation of fresh capacity for the manufacture of beer, the release said.

(*Financial Express* 15 February 1989, 1)

## FOOD REGULATION, QUALITY CONTROL AND HYGIENE

### 71 Clarification on weaning foods

Cereal or vegetable-based weaning foods containing less than 50 per cent milk solids by weight will be regarded as 'other processed foods' and not under the broadband of "all milk products expect infant milk food (Baby food)".

In a clarification, an official release said that 'weaning foods' for the purpose of broadbanding are those milk food containing more than 50 per cent milk solids by weight.

(*Financial Express* 28 February 1989, 11)

### 72 Treated supari is not a fruit product

Treated supari (betel-nut) is not a "fruit-product" within the meaning of Clause (F) Rule 29 of the Prevention of Food Adulteration Rules, 1955, the Supreme Court has held, reports Unifin.

"If 'supari' did not admit itself of being classified under 'fruit products' or under 'flavouring agents' under Rule 29(F) or Rule 29(M) respectively of the rules, the use in 'supari' of even coal tar food colours permitted under Rule 28 would amount to adulteration", the court added.

(*The Economic Times* 10 February 1989, 3)



## 73 EEC curbs nitrates

The European commission has agreed on plans that will have a significant impact on the use of nitrate fertilizers in Northern Europe. The move is an attempt to curb the build up of nitrate levels in water throughout the community.

If the commission's proposed directive is accepted, states will be obliged to devise specific programmes to combat areas where nitrates cause pollution.

Countries will have to set limits for chemical fertilizers, accounting for existing levels of nitrogen, the soil condition and the nitrogen take up rate of the particular crop.

The use of nitrate fertilizers or animal manure on waterlogged, flooded or frozen ground would also be controlled.

(*Chemical Weekly* 34(23), 1989, 105)

## 74 Salt controls high blood pressure

The Moscow Food Institute of the USSR Academy of Medical Science has prepared a unique salt in which part of the sodium is substituted by potassium and-to some extent-by magnesium. Both potassium and magnesium are good for cardiac activity. The new product has almost the same taste as ordinary table salt. Two kinds of the new salt are under development - one for everyday use and one for medical purposes.

(*Invention Intelligence* 24(1), 1989, 17)

## 75 Guar gum lowers lipid levels

Guar gum, obtained from the beans of legume Cyamopsis tetragonoloba, lowers lipid levels in the blood serum and liver, studies by Indian researchers indicate.

Scientists at the Central Drug Research Institute, Lucknow, studied the effect of different parts of the guar plant, the gum, seeds and splits, on the serum and liver lipids in rats and rabbits.

Group II received guar gum dissolved in water, Group III was given soaked guar seeds and Group IV guar splits in their diet. The lipid levels in the animals were increased through administration of triton, or ethanol or dietary fats.

In normal animals, guar gum (Group II) led to 48.3 per cent and 70.2 per cent lowering of serum triglycerides and liver cholesterol respectively, but the fall in serum cholesterol and total liver lipids was not significant. While guar seeds (Group III) significantly reduced only the serum triglycerides by 32.5 per cent, guar splits did not induce any serum triglycerides and total liver lipids.

The researchers have concluded that guar gum has a "definite hypolipidemic effect which is confined only to the gum of the plant and not other components".

(P.T.I. Science Service 8(1), 1989, 4)

## 76 Fruit that gives eternal youth

A detailed scientific study has been launched on a little known plant whose fruits are eaten by "Kani" tribals of the Agasthyar hills of Kerala to get "instant stamina, health, vitality and eternal youth".

Scientists of the Postgraduate Research Centre in Ayurveda at Trivandrum said the tonic effect of the plant was comparable to that of the famous Chinese herb ginseng and the plant may be the divine Varahi, dew described by Sushruta in his classing ayurvedic text".

The plant, which the Kani folks call "Arogyappacha", had been identified by botanists as "Trichopus zeylanicus." Its winged fruit has a leathery skin and a triangular shape.

Kani men could live for days without food and still remain energetic by eating few fruits of this plant daily, the scientists said in a report published in "Ancient Science of Life", a journal devoted to ayurveda.

(P.T.I. Science Service 7(22), 1988, 1)



## 77 Nisin preparation (NP) earns GRAS status

Nisin is a polypeptide produced through milk fermentation. It is named after the lactic acid bacteria (Streptococcus lactis group N). Nisin is used in processed cheese to inhibit the outgrowth of Clostridium botulinum spores and toxin's formation in pasteurized cheese spreads.

The petition for GRAS (Generally Recognized As Safe) was submitted to FDA (USA) by British manufacturer Aplin and Barrett. The petition was accepted last June, and FDA issued a GRAS status to Nisin Preparation (NP). The FDA stated at the time of granting the GRAS status that the Nisin should be used at levels consistent with Food Manufacturing Practices. According to British Standards Institution Methods, that level is a maximum of 250 ppm in the finished product.

(*Chemical Weekly* 34(23), 1989, 81)

## 78 Test for salmonella kit

Poultry farmers worried about salmonella in their flocks can now buy a kit to test for environmental contamination by the bacteria. The kit, produced by Medical Wire and Equipment in Bath, can detect the bacteria in just six hours, if more than 10 000 of the organisms are present in the sample.

The salmonella detection kit contains swabs to collect the sample and tubes of a nutrient broth that encourages the growth of salmonella but suppresses other bacteria. If after six hours at 37°C the broth changes from red to a yellowish green, salmonella is probably present. The final test involves mixing a drop of the broth with a latex suspension coated with antibodies to salmonella. If visible clots form within a minute, the test is positive.

The kit, which costs £ 45 for 25 tests, cannot distinguish between different species of salmonella, and will miss low levels of contamination. The manufacturers recommend incubating the tubes of broth for 24 hours before deeming the sample negative.

(*New Scientist* No.1644/1645, 1988, 29)

## 79 Waterproofing coatings

Polydee-11 (Food Grade waterproof coating): It is a clear, two components system waterproofing and corrosion resistant coating. It can be safely used in drinking water tanks and for coating in food and pharmaceutical industries. It can replace Polydee-10 and can be given any desired colour whereas Polydee-10 has only black colour.

(*Chemical Weekly* 34(21), 1989, 75)

## 80 Food safety laboratory faces closure

The British government's only research centre specialising in the safety of techniques for processing meat and meat products could face closure as part of cuts in agricultural research.

The centre, based in Bristol, is part of the government's Institute of Food Research. It assesses the safety of new packaging, storage and cooking techniques for meat and meat products. According to its head of microbiology, Terry Roberts, the centre's work is particularly important now as the food industry introduces new techniques.

"In the past, the philosophy was to cook food hard until all the bugs were killed. Now, the food industry is introducing new, more marginal methods such as vacuum cooking, industrial micro-waving and cook-chill techniques".

Roger Starr of the Institution of Professional Civil Servants which represents the scientific staff at the centre, warned that closure would 'erode' Britain's capacity to respond to problems of food safety.

(*New Scientist* No.1649, 28 January 1989, 25)

## 81 Irradiation of sea food and spices

The Minister of State for Science and Technology Shri K.R. Narayanan in a press release said here that the Government has decided to permit the use of irradiation for sterilising sea foods and spices meant for export after the Atomic energy (control of irradiation food) rules 1988 are notified.



The sterilisation process involves selective destruction of spoilage bacteria whereby acceptability and marketability of iced fish is extended by giving moderate doses of about 200 kilorads of radiation. This is the only method for removal of pathogens from prepacked frozen product.

Single treatment of gamma radiation can make spices free of insect infestation and microbial contamination without losing flavour components. The treatment can also be used for prepared ground spices and curry powders.

(*Pashudhan* 3(5), 1988, 2)

## 82 Microwaves and health

If you want to try some chemistry in a kitchen microwave oven, be warned: microwaves are dangerous and must not be allowed to escape the metal-lined cavity of the oven. You should use a microwave detector, which costs only a few pounds, to check that the microwaves do not leak through an ill-fitting door. In the laboratory, it is especially important to check for leakage if you make any modifications to the oven. Avoid heating volatile substances that could produce flammable mixtures inside the oven. Remember; microwave ovens have burst into flames even during cooking such innocent delights as mince pies.

Microwaves cannot penetrate metal but they can still induce electric currents and sparking if you put wire, or even gold-rimmed crockery, into an oven. Because conventional thermometers and thermistors rely on metal to work, you cannot use them inside a microwave oven. Instead, for temperatures up to 400°C, you must use an optical-fibre sensor. For temperatures higher than this, you need an infrared sensor.

If you are thinking of using microwaves to heat an organic solvent in the laboratory, there are a few guidelines for safety: use sealed Teflon containers with a pressure release valve (Teflon is transparent to microwaves and can withstand a pressure of seven atmospheres); keep the volume of solvent inside the container at no more than 15 per cent of total capacity; and never expose a reaction to microwaves for more than five minutes.

For many years, people were worried that microwaves could be dangerous to living things, apart from any heating they induce. In 1984, there was a report that DNA absorbs microwaves, which might lead to genetic damage. Last year, groups of scientists at Uppsala University in Sweden and King's College in London showed that this was not the case. They independently checked plasmid DNA over the microwave range of 1000 to 10,000 megahertz and found no evidence of absorption. Other claims that microwaves affect hearing, heart-beat and the brain have also been discounted.

A certain amount of microwave folklore has, nevertheless, grown up. Researchers have reported that avocado stones produce weird plants when exposed to microwaves. Ants apparently survive inside microwave ovens, presumably because they are far shorter than the wavelength of the microwave radiation (12 centimetres).  
(*New Scientist* No.1638, 1988, 59)

### 83 Chloroxyn liquid for waste water pollution control

Extremely powerful multi-functional CHLOROXYN liquid is available for the effective treatment of the waste water, required as per the Pollution Control Act.

Addition of only about 50 to 100 ppm CHLOROXYN into the waste water: keeps the filter media clean; removes iron and manganese; destroys hydrogen sulfide; removes colour; prevents fermentation; prevents algae, fungus and slimy growth; enhances coagulation of suspended fine particles; destroys foul odour, and ensures sterilization from the water borne diseases.

For further information contact: Surfochem Industries, 3, Nilkanth Sadan, Peru bagh, Aarey Road, Bombay - 400 063.

### 84 Decaffeinate coffee by SFC

The world's second and USA's first plant to decaffeinate coffee by Supercritical Fluid Extraction (SFC) has been started up in Houston by General Food Corp's Maxwell House Coffee Co. (White Plains, N.Y.).



The unit's capacity is reported to be about 50 million lbs/year, and that the route differs from the one at its HAGGF AG subsidiary in Bremen, West Germany, the only other decaffeination facility in the world to use SFE.

Decaffeination is generally done using such solvents as water/methylene chloride, water/CO<sub>2</sub> and ethyl acetate. In the GF plant, supercritical CO<sub>2</sub> is used to remove caffeine from the beans prior to roasting. Extraction is reportedly done at 90-100°C, under a pressure of about 3,000-4,000 psi. The caffeine laden solvent is then depressurized by passing it through a valve into another vessel.

The caffeine precipitates as a result of the pressure drop and is separated from the gas. About 97% of the caffeine is removed, which is similar to the efficiency of other processes. The main reason for adopting the route is a very pronounced improvement in quality and flavour of coffee over any other process.

(*Chemical Weekly* 34(14), 1988, 81)

#### 85 US food cos to stop use of palm oil, coconut oil

Major American food companies have decided to stop using coconut oil and palm oil in their products because of health concerns, a published report said.

These oils are high in cholesterol and are said to cause heart attacks, reports PTI.

The Philippines, produces 39.8 per cent of coconut oil in the world and Malaysia produces 56.6 per cent of palm oil. They are major exporters of these oils to the US. The two countries are fighting a losing battle to convince the food companies that the consumers are wrong and that longevity does not depend on the kind of oil one consumes.

(*The Economic Times* 7 February 1989, 3)

## 86 Vanaspati units plea to relax BIS specification

The Indian Vanaspati Association has urged the Bureau of Indian Standards (BIS) to relax the specification in regard to coating on tin on 15 kg containers used to pack vanaspati.

The specification stipulates that the tin coating on the containers should be 11.2 gm on 15 kg tin. The reason for higher tin coating appears to be at the insistence of defence authorities for whom vanaspati is packed in larger packs to withstand their transportation and storing conditions which are rigid.

The only three manufacturers of tin plates in India are not able to meet the demand of the vanaspati industry. The total tonnage of tin required which is fully imported is about 5000 and foreign exchange outgo is about Rs. 150 crores. If the thickness of the coating could be halved to 5.6 gm, foreign exchange valued at about Rs. 80 crores could be saved. It is also necessary to examine whether thinner sheets could be used to manufacture the container. (*Financial Express* 21 January 1989, 4)

## 87 Ban on use of colours in food items likely

Use of colours in food items is to be banned.

There was a consensus in this regard in the Lok Sabha on Wednesday.

The Health Minister, Mr. Motilal Vora, accepted the Speaker, Mr. Balram Jakhar's suggestion to bring forward a Bill banning use of colours in food articles.

The issue figured during Question hour when several members expressed grave concern at the widespread use of banned colours in food items, which, they said, has become a major health hazard. (*Financial Express* 1 December 1988, 4)



## TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

## 88 Public sector food processing unit in Tamil Nadu

The Union Government is planning to set up a Rs. 5 crore food processing unit in Yeracaud in Tamil Nadu in collaboration with Swiss firm. The unit will have cold storage facilities for mango, pineapple and apple pulp besides potato chips, chicken and eggs. (*Chemical Products Finder* 7(7), 1988, 148)

## 89 Foray into food processing

Britannia Industries Ltd (BIL) has cooked up plans to enter the rapidly expanding food processing business. Its menu: snack foods and texturised vegetable protein products. In snack foods the company is to initially make only nuts, cheese balls and cheese curls. "Texturised vegetable protein products", says Sunil K Alagh, BIL executive vice-president. (operations), "will be easy to cook and will be available at affordable prices". (*Business World* 15-28 February 1989, 39)

## 90 Double cola to enter food processing

Double Cola Manufacturing Co (DCMC), the soft drink manufacturers promoted by a group of non-resident Indians, has entered into a technical arrangement with Alfa-Laval of Sweden for the supply of machinery needed for its fruit and vegetable processing plants. While Alfa-Laval will provide the homogenisers and pasteurising equipment, Italian and Japanese technology will be used for processing.

The company will initially introduce fruit juices, pulps and ready-to-drink beverage. The food processing activities will be an extension of its soft drink manufacture and will be set up at the company's soft drink plants where additional capacity is available.

(*Chemical Products Finder* 7(8), 1989, 100)

## 91 Liquipaks' venture

Liquipaks India Ltd has signed a memorandum of understanding with Duke & Sons to manufacture and market a new range of fruit juice products in tetrabrik containers. The company is poised to launch in Bombay and Pune initially. It is making special efforts to reach about 40,000 outlets in Bombay.

*(Industrial Products Finder 17(2), 1988, 81)*

## 92 Pineapple juice unit coming up in Assam

Modern Food Industries (India) Ltd is setting up a pineapple juice concentrate plant in Silchar, Assam. This is scheduled to be completed by 1989-90. The company is planning additional bread line and the facility in the Delhi bakery unit was commissioned in November 1988. The expansion of the fruit juice bottling plant in Delhi was also completed and the expanded capacity was inaugurated in 1988. The company achieved a gross turnover of Rs. 46.39 crore during 1987-88 against Rs. 42.24 crore in 1986-87.

*(Chemical Products Finder 7(9), 1989, 149)*

## 93 100 per cent instant coffee export unit set up

Asian Coffee Ltd, Secunderabad, is the first-ever 100 per cent instant coffee project, set up at Brahmanpalli village in Medak district of Andhra Pradesh. The Rs. 11.45 crore project, set up in technical collaboration with Brazilian Food Project Ltd (BFP), will have a capacity to produce 1,500 tonnes per annum of pure soluble coffee. It also has financial participation from Brazil and the Commonwealth Development Corporation (CDC) of the UK.

The equipment for the project has been obtained from suppliers all over the world, including Niro Automizer of Denmark for the supply of spray dryer. The plant is equipped to use both Arabica and Robusta coffee beans. The finished products will be marketed both in the US and the UK through leading retailers.

*(Industrial Products Finder 17(3), 1988, 101)*



## 94 Instant tea from goodricke

Goodricke Group Ltd (GCL) has started implementing its instant tea project. A pilot plant has been established at one of the tea estates and trial production has started. Test marketing is expected to begin sometime next year. According to the Chairman, Mr. M W Butterwick, the product would be highly superior to any other instant tea. The company's exports for the year ended June 1988 stood slightly higher at Rs. 2.39 crore.

*(Chemical Products Finder 7(9), 1989, 162)*

## 95 Amrit protein to launch soya products

Amrit Protein and Foods, a company promoted by Amrit Banaspati, is setting up a Rs 14.5 crore project at Ghaziabad, U.P., for the manufacture of soyamilk and soyamilk-based products. The project will have an installed capacity of 23,500 kilolitres of soyamilk per annum. Trial production of this project, which will use Danish technology, will begin in January and commercial production in March. The company has developed the typical flavours and consistency to the palate of Indian consumers and has developed a device to remove the beany taste of soya disliked by Indians. The company will manufacture mainly soyamilk and soyamilk-based products like cheese and other items.

*(Chemical Products Finder 7(6), 1988, 129)*

## 96 Rice processing plant in Punjab

A Rs 62-crore rice processing plant, set up by the Oswal Agro Furane at Dhuri in Sangrur district of Punjab was recently inaugurated. The complex will be processing 5.76 lakh tonnes of paddy per annum. The company has signed an agreement with the Food Corporation of India for the supply of six lakh tonnes of paddy per annum for five years.

*(Chemical Products Finder 7(8), 1989, 110)*

## 97 Cadbury's into ice-cream

Hindustan Cocoa Products Ltd (HCPL), manufacturer of Cadbury's Chocolates and Food Drinks plans to enter the Ice-cream market in India. Test marketing of HCPL's "DOLLOPS" range of ice-cream will commence in January 1989 in Hyderabad. Some unique flavours and product innovations are planned as a part of the entry strategy.

Since ice-cream manufacturing in India is presently reserved for the small scale industry, and a large capacity lies unutilised all over the country. HCPL plans to get its Ice cream products manufactured by such small scale units and provide them technical assistance and guidance to attain high overall quality and hygiene standards.

Cadbury's entry into the Ice cream field is expected to accelerate the development of a "cold chain" of low temperature storage facilities throughout the country, which is required for Ice cream and similar products.

(Commerce 157 (4045), 1988, 25)

## PERSONALIA

## 98 New Director for Spices Board

Dr. C.K. George has assumed charge as Executive Director of the Spices Board.

He was holding the post of joint commissioner (horticulture) in the Union Ministry of Agriculture till now, says a Spices Board release.

(The Economic Times 18 December 1988, 1)



SPECIAL ARTICLE

## COLOURS IN FOODS

Nature would not have been so beautiful if there were no varying shades of colours. Colour is a psycho-physical phenomenon which, apart from adding an aesthetic touch to life, forms one of the important criteria for quality judgement and acceptance, influenced by experience and association. Thus colour renders food appealing and appetizing. Apart from giving an attractive appearance and substantial visual appeal, food colours also help elicit cephalic phase of gastric secretion, thereby promoting digestion and absorption of nutrients from food. It is of paramount importance that the food which we consume every day should be devoid of any extraneous matter such as additives and pesticide residues. However, in modern times, with both the spouses going out for work, processed foods find their way into the household.

**Processed foods**

Processing of food, as is known, helps avoid wastage of seasonal surpluses of perishable products, ensures their uniform supply throughout the year and enables availability even in distant areas. Artificial colouring becomes a necessity in the modern technology of processed foods, especially in the case of canned and pulped fruits and vegetables which tend to lose their natural shade during processing or storage.

It is logical to think that natural colours should be used in colouring foods. This is because we do ingest these natural colours to a certain extent and hence they can be assumed as harmless. However, the difficulties in the use of natural colours are mainly as follows :

- 1) High cost of extraction and low yields
- 2) Colour instability with altered conditions of pH, light, heat and freezing
- 3) Low tintorial value

The intake of these natural colours will be higher when added to foods, since larger amounts have to be used to achieve a desired shade. Moreover, the added natural colour may react with the nutrients and can make them unavailable. According to the industry, natural food colours have not been commercially and economically produced in this country. Hence to meet the demands, we may have to depend on synthetic colours to be used in foods.

### Synthetic colours

The chemical colouring substances which can be used in food industry are commonly known as 'Coaltar colours'. This is a misnomer and needs to be corrected as 'Synthetic colours'. The profile of global production of food colours is given in table-1. Based on the production/population ratio, the availability of food colour in India is computed at 0.6 mg/day/person. It may be interesting to note that this is 50 times less than the intake figure in USA and 30 times less compared to that in UK.

Table 1.

#### PROFILE OF FOOD COLOUR PRODUCTION IN THE WORLD (1982)

	Tonnes
USA	2540
Western Europe	1160
Asia	1315
South America	870
Africa	625
U.K.	495
Australia	255
East Europe	240
India	135



Most of the synthetic colours have been extensively tested in conventional toxicity studies. Usually the toxic effects are observed at very high level of intake i.e., at 1-5% level in the diet. Such a level of intake is not practically seen in reality. The acute health hazards posed by these substances often appear small compared to those of other dietary constituents. However, most of these colouring substances are considered to be carcinogens. With due consideration to the toxicological data available, each country permits use of certain synthetic colours in foods.

The number of synthetic food colours permitted in Australia is 17 while USSR permits the least number viz. 3 and Greece is the only country which does not permit use of any synthetic colour. The Government of India permits 10 colours. France, West Germany and UK use more number of colours than India. USA, Japan and Canada permit 7, 8 and 9 colours respectively.

The toxicological data collected from the literature on permitted food colours in India are summarized in table-2. Based on these data the WHO has allocated the Acceptable Daily Intake (ADI) for these colours. Synthetic food colours permitted in India and their ADI are given in table - 3.

#### Abuse of colouring substances

On a compilation and analysis of data over a 11 year period (1960-70) on 12,575 coloured food samples (milk products, non-milk products, pulses and miscellaneous items such as sugar products, soft drinks, alcoholic beverages, other beverages, tea, some spices and condiments), S.K. Khanna et al., from U.P. found use of non-permitted colours in 70% of samples. Frequency of use of non-permitted colours are metanil yellow (29%) rhodamin (8%), melachite green (4%). According to their latest study (1985) as compared to city markets, rural population was experiencing a greater degree of threat from the use of non-permitted synthetic colours.

A limited survey conducted by us recently in Hyderabad showed a similar trend between urban and rural areas in the usage of non-permitted

colours in foods. However, surprisingly, the magnitude of usage of textile colours in foods has reduced considerably. Perhaps this could be due to the awareness of the toxic effects of non-permitted colours both among the manufacturers and consumers. Availability of permitted colours in smaller packets under ISI Certification could be another reason.

Table-2  
DATA ON SAFETY EVALUATION OF FOOD COLOURS

Colour	Metabolic studies	Short/Long term studies	Teratogenic, Mutagenic Carcinogenic studies
1. Amaranth	Reduction seen at Azo linkage	No evidence of toxicity British study shows difference	Nonteratogenic, Non mutagenic Carcinogenicity controversy
2. Brilliant blue	Poor absorption	No adverse effects	No toxic effects
3. Fast green	Poor absorption	No mortality, No toxicity	No carcinogenicity
4. Green S.	Poor absorption	No ill effects	
5. Indigo carmine	Mostly excreted Poor absorption	No toxic effects	No alarming signs of toxicity
6. Ponceau 4R	Bile plays an important role. All eliminated	No deviation seen	No toxic effects
7. Sunset Yellow	Gut flora plays important role Reduced, metabolites are excreted	No effects on growth rate, organ weights	No tumorigenicity/ Carcinogenicity
8. Tartrazine	Major portion is excreted as metabolites	No adverse effects	No evidence of tumor formation. Allergic reaction implicated in certain cases.
9. Erythrocine	Poor absorption	No adverse effects	No cytogenic effects & Carcinogenicity
10. Carmoisine	No absorption	No toxicity	No harmful effects



### PFA Regulations

Under the Prevention of Food Adulteration Act (PFA) Rules, the Government of India has stipulated (in Rules 30, 32 and 33) that the maximum amount of colour permitted in food is 0.2 g/kg i.e., 200 ppm; synthetic colour used should be pure and free from harmful impurities; and every label on the food which is permitted to contain a colour shall carry the statement 'contains permitted colouring agent'.

Table - 3

#### ADI OF PERMITTED SYNTHETIC COLOURS IN INDIA

Colour	Name	Accepted daily intake (ADI) (mg/kg. body weight)
A Red	1. Amaranth	0.75
	2. Carmoisine	1.25
	3. Erythrosine	1.25
	4. Ponceau 4R	0.125
B Yellow	5. Sunset Yellow	2.5
	6. Tartrazine	7.5
C Green	7. Green S.	5.0
	8. Fast green	12.5
D Blue	9. Brilliant blue	2.5
	10. Indigo Carmine	5.0

All the 'natural' or synthetic food colours should be sold only under ISI Certification mark. The 10 permitted synthetic colours can be added only in certain foods specified in Rule 29 of PFA Act.

## Implementation of food laws

To implement these food laws, Government Analysts need simple and quick methods to identify adulteration. Recently we have developed a simple and rapid method for differentiating permitted colours from textile colours. This method can be carried out in the field by Health Inspectors and also at the household level. The most salient feature of this method is that it does not require use of any standard colour or special solvents or equipment.

Now the question arises as to whether we should straightaway accept what WHO has recommended and permit use of these colours and compute ADI on that basis in our country. One should give some thought as to why certain other countries do not permit some of these food colours.

## Dietary habits and toxicity

Dietary habits influence the toxicity of a substance. Since the safe limits of pesticide residues in cereals as allocated by WHO do not hold good in our country, we have to redefine our own safety limits and ADI. This calls for further toxicological evaluation of both synthetic and natural colouring material.

The following precautions become mandatory while using synthetic colours in foods.

(a) Stop the use of those synthetic colours which fall under any shadow of doubt (b) Replace synthetic colours by natural colours in a phased manner after safety evaluation. (c) Allocate safe limits and ADI after toxicological evaluation of synthetic colours carried out under Indian conditions such as undernutrition and prevalent food habits (d) Introduce a constant monitoring mechanism to ascertain possible ill effects of food colours, and (e) Educate small scale manufacturers and consumers about the harmful effects of non-permitted colours.

The government is pressurised periodically to place total ban on food colouring in order to check adulteration. It should be realised that surveillance and not mere legal action is the panacea.

If a total ban on food colours is considered essential to protect interests of public health, it is imperative on the part of the government to ban other food additives and also use of other natural products like



supari (betel nut), tobacco etc., which are well established carcinogens in animal systems as well as in humans. However, if after careful scientific evaluation, acceptable intakes are determined, it should be possible to permit both natural and synthetic colours.

Dr.Babu, S and  
Dr. Shenolikar, I.S.

*(Reprinted from Nutrition News 9(6), 1988)*

## RAW MATERIALS

## 89 New varieties of oilseeds evolved

Biotechnologists of the Indian Agricultural Research Institute (IARI) have virtually worked wonders with the oilseed plants (*Brassica* species), treating the much-needed opportunities for evolving new varieties capable of making the country self-sufficient in cooking oils.

Some of the plants, regenerated in test-tubes from tissues are deemed precious because of their rare genetic characteristics which can be gainfully exploited.

Among the genetically manipulated material having commercial potential, is the new source for resistance to shattering in rapeseed (*Brassica napus*). One of the formidable handicaps in the cultivation of rapeseed throughout the world is the absence of resistance to shattering in the available germplasm. The gene carrying this character is therefore, expected to carry good international price.

This gene has been successfully introduced into the plant through a complex technique of wild hybridisation between species which are generally difficult to breed. The "reconstituted plant" has shown normal flowering.

According to the head of the biotechnology centre, Prof. V.L. Chopra, this character can now be transferred to the species (*Brassica Juncea*) predominantly grown in India.

An achievement of the biotechnology centre, which can be of significant immediate importance is the evolution of over a hundred genetically superior lines (scientifically called somaclones) of the popular variety, Varuna. These lines have already gone through one year of experimental testing and have shown a remarkable improvement in some of the agronomic traits, especially early crop maturity. This helps the plants to escape moisture stress besides diseases and pests, including the dreaded aphid.

(The Times of India 9 March 1989, 8)



## 100 Soyabean for more milk

Roasted soyabeans fed to cows as feed supplement increases milk yield substantially according to a study conducted at the University of Nebraska, U.S.

Experimenting with lactating cows, researchers noted that roasted soyabeans fed to the animals either whole, ground or pelleted along with hay, silage and corn brought about an increase in the level of milk yield compared with raw soyabeans. It was also found out that roasted soyabeans gave better results than soyabean meal. Feeding them as such also helped in prevention of rancidity problems in cows.

*(The Hindu 19 April 1989, 24)*

## STORAGE AND INFESTATION CONTROL

## 101 Honey can substitute for sulfite preservatives in wine/fruit juices to prevent browning

Honey has proved a good possible substitute for sulfite preservatives in wine and fruit juices and if it is used early enough in production, should not affect the sweetness of the beverages. Sulfites are used to prevent unwanted fermentation and oxidation, but a small number of people are allergic to them.

Scientists at Cornell University's Agricultural Experiment Station in Geneva, N.Y. explain that 1-10% by weight of honey can be added to fruit juices, which are then agitated and allowed to settle at room temperature for several hours. A brown sludge of macromolecules sinks to the bottom of the juice and is filtered out and the juice stays clear indefinitely. The researchers are not quite sure what component of the honey is the important one, but they believe a protein originating with bees (rather than flowers) is responsible for inhibiting browning.

*(Chemical Weekly 34(27), 1989, 82)*

## 102 Preserving foods with natural additives

In modern food technology not all preservation methods involve mechanical treatment. Another process preferred to add shelf-life is to inhibit rancidity by using natural preservatives.

Synthetic antioxidants have been used for some time and with the blessing of most countries around the world. BHA and BHT and TBB are permitted in USA and most European countries but rancidity remains a problem. What's more, consumers are keenly aware of the presence of these additives on a label.

Rosemary and Sage have been used as antioxidants in meats. Rosemary extracts have also been used in bland foods, such as instant potato products. Unfortunately increased use has been limited by high flavour levels, poor solubility and other processing difficulties.

As a result of a recent new extraction procedure developed at Rutgers University by Dr. Stephen Chang, the use of natural antioxidants has become more practical.

The procedure has been licensed and commercialised by Kalsec Inc. (Kalamazoo, Mich). The antioxidant fraction in Rosemary has been effectively extracted and standardised in an oleoresin readily soluble in oil. It is also offered in water dispersible and speciality formulations. The product is called 'Herbalox seasonings'.

Recent tests at Michigan State University indicate 'Herbalox' helps to stabilize fats and essential oils against rancidity. It retards fading of carotenoid pigments, enhances the flavour of low pH dressings and sauces, and effectively guards against unwanted 'warmed over' flavours in food products. These occur when entries are relicated, introducing off flavour tastes and aromas. Herbalox can inhibit the formation of these flavours even at levels of 0.05% based on fat content.



With the standardization of potency provided by Herbalox, food manufacturers can inhibit rancidity with an extract labelled 'Natural'. Applications include baked goods, breadings, cereals, confections, fat and oils, sausages, noodles, and processed poultry and meat snack foods, soup and bases and more.

Other advantages derived from using Herbalox include:

- .. Simplified labelling. Natural flavour added is sufficient.
- .. Protection provided is comparable to synthetic antioxidants.
- .. Heat stability provides food carrying through for extended shelf-life products.
- .. Control of the flavour, aroma and antioxidant fractions of simplified use.
- .. Available in both oil-soluble or water dispersible forms.
- .. Compatible with other ingredients.
- .. Resistance to steam stripping permits low usage levels.
- .. Excellent cost/benefit ratio.

Herbalox works by neutralising troublesome free radicals during oxidation. Rancidity results when oxygen reacts with fats. The chain reaction is propagated by highly reactive free radicals. A number of compounds in Herbalox are phenolic molecules capable of donating a hydrogen which stabilizes the radicals.

(*Chemical Weekly* 34(27), 1989, 81)

### 103 Hollow bamboo bin

The Indian Grain Storage Institute at Jorhat, Assam, has developed a new design of "Hollow bamboo structure" for storage of high moisture paddy seed. The structure is made out of locally available bamboo strips with adequate facility of aeration and drying as and when required. A lid has also been provided which can make the structure airtight as and when needed. Its capacity may range between 30 and 100 kg (paddy seed).

The structure was put under test with high moisture paddy content (20.2 per cent) for 12 months and after a 10 month storage period the moisture content was gradually lowered to 15 per cent. The seed germination was observed 76 per cent at 20°C and 78 per cent R.H. (relative humidity). (*The Hindu* 19 April 1989, 24)

#### 104 Refrigeration expertise applied to cereals storage

Significant savings in drying costs for cereals stored in silos are possible using the Frig-0-Dry system now being introduced to Britain by Ajax (UK) Limited, the international manufacturer of refrigeration and air conditioning equipment for industrial and commercial purposes. These mobile Frig-0-Dry units are connected by flexible ducting to the base of the silos, as and when required, and are used to blow chilled and dehumidified air upwards through the cereals. The stored product is simultaneously cooled and dried by the air until its temperature and relative humidity are at the equilibrium conditions recommended for preservation.

This ability of the Frig-0-Dry to dry the grain while cooling it is a major advantage, because the operation can be discontinued a few points above the humidity that would normally be acceptable for storing grain having a higher moisture content, thus facilitating the cost-saving. The drier the product, the higher can be its storage temperature.

Mounted on a rubber-tyred, wheeled chassis equipped with towing bar, and operating from a 415 V three-phase 50 Hz power supply, the Frig-0-Dry system essentially comprises a packaged refrigeration unit and a centrifugal fan housed in a heavy galvanized and painted steel enclosure. The fan draws external air in through a filter, across the refrigeration evaporator and through a reheat coil to control the humidity before discharging it into the silo. The required temperature and humidity conditions of the cereals are set by positioning the variable controls on the built-in-Frig-0-Dry monitor, which



is connected to a cable temperature probe extending the full depth of the silo. The unit is very easy to operate.

Four models are available operating on R22 refrigerant and providing refrigerating capacities of 15, 30, 60 and 120 kWh<sup>-1</sup> (4.25, 8.5, 17 and 34 Tk), respectively. In equivalent weight of cereals, these models will treat 30-45, 60-90, 120-180. and 240-360 tonnes weight during a 24 h period.

Refrigeration treatment preserves the cereals for long periods, without loss of quality, so that the product is always at optimum marketable condition. Losses caused by cereals 'breathing' are avoided. The development of insects, parasites and moulds is prevented, thus eliminating the need for chemical disinfection.

For further information contact: Ajax (UK) Limited, Veneto House, Park Drive, Rayners Lane, North Harrow, Middlesex HA27LT, UK.

(*Int. J. Refrig* 12(1), 1989, 51-52)

#### 105 Passive evaporative cold storage for potatoes

A team of researchers at the Central Potato Research Station, Jalandhar, Punjab, have developed a unit for passive evaporative cold storage of potato, to minimise losses during storage.

The unit works on the principle of passive evaporative cooling. Its outer walls are made of bricks or stones. A small cavity left in between these walls is filled with rice husk. On one of its wall are ventilators packed with wood-wool. The wood-wool is continuously moistened with dripping water. Its floor has a wooden platform for putting potato bags.

On the top is a wind shield which acts as an exhaust. At this shield is removed, air comes out through a hole. Under the shield are two wire-mesh screens through which cold moist air comes in. Wood-wool is packed in between these screens.

As the shield is removed, humidified, cool air enters the stores through the ventilators and hot air rises above the ceiling and escapes through the exit. As the air comes in, it evaporates and produces a cooling effect. The lower temperature and considerable higher relative humidity help to store potatoes better.

The temperature inside the storage-unit varies from 6-13 degrees Celsius, which is lower than the ambient temperature during March to June. With the decrease in temperature, the relative humidity increases upto 76.5-94.0 per cent. The stored potatoes give 100 per cent sprouting while seeding, and the total loss in weight is comparable to that of potatoes stored in conventional stores.

The unit has been found to be well-suited for storing potatoes upto the beginning of June even in the Western Indo-Gangetic plain, especially in regions where cold-storage facilities are inadequate and potatoes are stored in ordinary stores during the hot summer months (SD).

(P.T.I. Science Service 8(4), 1989, 5)

#### 106 New food preserving process

An Australian Company, Garwood Limited, Melbourne, has invented a food packaging system which enables perishable food to remain rich and fresh weeks after chiller storage. Called Flavaloc, the new pack has a polymer membrane pillow which serves as a reservoir for a gas mixture. The gas mixture diffuses at a controlled rate into a chamber containing the perishable food, preserving its freshness and appearance while suppressing bacterial and fungal growth.

(Invention Intelligence 24(2), 1989, 63)



## 107 Scaring away the rodents

A scientist at the Jawaharlal Nehru University has developed a simple and inexpensive electronic device to scare away rodents instead of instantaneously killing them. According to Dr.J.Behari, Associate Professor at the School of Environmental Sciences at JNU, the new device offers greater promise in food grain godowns where foodgrain worth millions of rupees is destroyed or devoured by rodents every year.

This instrument emits frequency waves in air in all directions bringing about panic and stress conditions upon the rats acoustic nerves and cerebrum which in turn causes disorientation and confusion. The result is that rodents try to get away from the godown as early as possible. The effect of the ultra-sound is that they eat less, reproduce less, develop low-body-resistance and become inactive.

(University News 27(10), 1989, 17)

## 108 Weather proof bait stations for rodent control

To combat the widespread menace of rodents in the country, Indian scientists have developed new weather-proof rodent "bait station" which, they say, may offer the best method as yet of rodent control.

India is estimated to have over five thousand million rodents, of 52 diverse varieties, that cause extensive damage to the crops. Controlling these animals during rainy season poses a special problem, as most of the baits put inside the traps deteriorate very fast in the rains. Scientists at the Garhwal University, Uttar Pradesh, have attempted to find an answer to this problem with the development of new weather-proof traps that do not get affected by the rains.

The "bait stations" are of two types: the first type consists of a polyethylene-clad hut like structure. It is 25 cm long, 15 cm wide at the base, has a slant height of 15 cm and can be opened from both sides. It costs only 40 paise. The

second type is a cylindrical metallic container with a radius of 5.5 cm and length of 25 cm. It can be opened from one side only. It is provided with a hood projected 6 cm over its mouth to guard the bait against the showers. It costs Rs. 1.20 only.

For the bait, 0.005 per cent bromadiolone or small tablets containing four grams of zinc phosphide, 96 grams of grain or flour, half-spoonful of mustard oil and water are used. The traps are placed at the mouth of burrows of rodents.

These bait stations have been used to control four dangerous rodent species affecting the finger millet or 'ragi' fields in the country during rainy season. Both types of bait stations, paper polythene hut and metallic tin, proved to be very effective, causing about 87.5 and 92.5 per cent rodent mortality respectively, according to a report in the 'Indian Journal of Agricultural Sciences'.

(P.T.I. Science Service 8(5), 1989, 3)

## FOOD ADDITIVES

### 109 Improving qualities of dairy products via biotechnology

Enhancing the flavour and textures of fermented dairy products by genetic engineering will be possible in future. Through genetic engineering, it will be possible to construct starter cultures than confer unique qualities to fermented products. For example, it may be possible to develop cultures capable of producing natural flavour compounds (peach, banana, berry, citrus) or protein with intrinsic non-caloric sweetness properties (aspartame, therimatin, stevioside) to enhance the flavour and eliminate the need to add sucrose during the manufacture of yoghurt or flavoured cheese spreads. Construction of strains capable of producing extracellular polysaccharides would eliminate the need for the addition of stabilizing or thickening agents in yoghurt.



Dairy products serve as a primary source of calcium in the human diet. In addition they are an excellent source of protein and fat-soluble vitamins. However, most dairy products, with the exception of yoghurt and cottage cheese are often high in saturated fats and cholesterol. In the future, it may be possible to engineer starter cultures with the capability of enzymatically modifying cholesterol to nonatherogenic steroid derivatives. Similarly, it may be possible to enzymatically modify the saturation level of fat or to alter the absorbability of saturated fats fraction.

*(Chemical Weekly 34(35), 1989, 81)*

## PROCESSES

### 110 Amino acid from sugar fermentation

A University of Melbourne research team, has developed a process for low-cost production of the amino acid tryptophan, from bacteria. Tryptophan is one of the 'essential' amino acids, used in pharmaceuticals and health foods. Tryptophan has proved difficult to produce cheaply, so its use is more restricted than that of the other amino acid food additives.

Although animals are generally not able to manufacture this amino acid, bacteria can synthesis it via fermentation from sugar. But bacteria produce only enough tryptophan for their own needs - they have developed a number of control mechanisms that regulate production of the substance.

What the team did was to identify these control mechanisms and 'switch' them off. To further increase the production of tryptophan. The researchers added copies of certain genes to the bacteria's DNA to enable the organisms to make 100 times more tryptophan than usual.

*(Asia-Pacific Tech Monitor November-December 1988, 21)*

## 111 Coconut oil extraction process

National Institute of Science and Technology, Philippines has developed a simplified and cheaper process of extracting edible oil from coconut without the use of sophisticated equipment. The end product extracted it is reported can be stored for 3 to 6 months without change in colour, flavour and odour. The milk is extracted from the coconut by hand pressing. The extracted milk is then allowed to stand for one hour to separate the cream from the skim milk. Cream is filtered and washed with salt solution, finally with tap water several times to remove other elements present other than oil. The washed cream is then boiled to remove excess water and to allow the fine solid cream to subside. The remaining cream is filtered before storing in closed bottles.

For details contact: National Institute of Science and Technology, P.O. Box 774, Metro Manila, Philippines.  
(*Asia-Pacific Tech Monitor*, November-December 1988, 21)

## 112 A new protein-rich corn oil developed

Corn kernels contain less than 10% protein. This low protein content does not match up too well against something like soybeans, which contain 38% protein. In addition, the corn protein is low in two 'nutritionally vital' amino acids lysine and tryptophan. Research work which began in USA in the 1970s to increase corn's lysine content has now come to fruition, and the researchers are seeking a patent on the technology. Cytogeneticist Ron Philips and his research group at the University of Minnesota have found a gene that effects lysine production sometimes increasing it as much as 20%.



The University of Minnesota researchers note that an improved corn twice as nutritious as the ordinary variety was recently introduced in Mexico. But that corn gave 'floty, soft kernels that do not store well' and the improvements depend on 'a complex genetic system, rather than one gene that gives high lysine' Phillips reports. The new corn variety developed by the Phillip group brings no undesirable effects, and the fertility and quality of the corn is completely normal. (Chemical Weekly 34(35), 1989, 83)

### 113 Coconut oil derived surfactant

In India, coconut oil finds use in foods and edible products. However worldwide, use of coconut oil in edible products is declining, while its use in industrial and soap products is progressing. Market for coconut oil fatty acid is also growing slowly in USA. There is a long term trend towards increased use of coconut and palm kernel oils in fatty alcohols. Two new UD alcohol plants have been announced.

Recently, Stepan Company has unveiled Alpha Step ML-40, a new safe biodegradable anionic surfactant. The alpha sulfomethyl ester product is derived from a natural renewable resources - coconut oil - and is completely independent of ethylene based raw materials.

Alpha-Step ML-40, an aqueous solution of sodium alpha sulfo-methyl ethyl laurate, exhibits food detergent and foam properties, in addition to being an excellent solubilizing agent - for high active systems and readily soluble in water. Dry skin irritation studies show the new surfactant is milder than conventional lauryl ether sulfate.

It is recommended for use in heavy duty laundry detergents, manual liquid dishwash, fine fabric wash, hard surface cleaner, shampoos, liquid hand soap and bubble baths.

(Chemical Weekly 34(35), 1989, 82-83)

## 114 Bread without wheat!

A new, simple and inexpensive technology has been developed for making bread without wheat, using tropical roots, tubers and coarse grains.

The process carries the potential for reducing Third World dependence on imported wheat. Food and Agriculture Organisation (FAO) specialists say the use of traditional crops in bread production could have profound implications for developing countries.

Although roots and tubers nourish over 1,000 million people in Africa, Asia and Latin America, they have received little official recognition because they are not within the experience of many international experts.

It is estimated that each year about 550 million tonnes of staple roots and tubers are harvested worldwide. While potatoes constitute about half that harvest, and another 40 per cent comes from cassava, sweet potatoes, yams and taro.

Worldwide research for an alternative to wheat bread has been going on for 30 years. The main problem has been that non-wheat materials have no gluten-forming protein which, through kneading, gives bread its unique texture and flavour.

FAO has also successfully experimented with replacing gluten by Xanthan gum. The gum can be made by developing countries, but is expensive. The bread produced had a shelf-life of eight days, which is better than wheat bread.

Developed by FAO scientists, the new technology has overcome the gluten-problem. The process involves boiling part of the root or cereal crop flour until it forms a thick gel, cooling and adding the remaining flour, yeast, sugar and salt; mixing for five minutes and leaving the dough to rise to about double in size in a warm and humid place.

The technique is claimed to produce wheatless bread of excellent taste, texture and colour. The bread is also claimed to stay fresh longer than white bread. Its versatility allows combinations of flour from roots and grains to increase nutritional quality.



FAO has started discussions with developing countries such as Nigeria, Sudan and Cuba on the possibility of introducing the technology in order to make better use of local crops. Satin says a rural group in Kenya has successfully tried the technology. (*Deccan Herald* 30 March 1989, IV)

115 Process to reduce cholesterol in milk

Scientists at Cornell University say they have developed a commercially feasible process to remove up to 90 per cent of the cholesterol and reduce the amount of saturated fats in milk, without significantly changing its taste.

The technique, similar to the process used to decaffeinate coffee, might also be used to produce a variety of other low-cholesterol dairy products like butter, cheese and ice cream, said Syed S.H. Rizvi, a professor of food engineering at Cornell's College of Agriculture and Life Sciences in Ithaca, N.Y.

Dr. Rizvi and his associates used a process in which carbon dioxide is injected into butter fat under high pressure, picking up cholesterol-laden fat. The butter fat, which gives milk its flavour, is manipulated to remove most of the cholesterol and then returned to the milk.

Dr. Rizvi said the resulting milk contains 2 per cent butter fat, of which less than 40 mg per gallon is cholesterol. Whole milk contains 3.3 per cent butter fat, of which about 532 mg per gallon is cholesterol.

(*Deccan Herald* 27 April 1989, I)

116 Food-grade protein from sunflowers

Scientists at the Highett, Vic., laboratory of Australia's CSIRO Division of Food Research have found a way to isolate sunflower protein free of colour. Their method extracts the protein in a continuous process, opening the way for commercial utilization. At the moment CSIRO is looking around for a company interested in developing the patented process to an

industrial scale. The CSIRO team believes the cost of sunflower isolate would be comparable to that from soy, and probably less. The CSIRO process extracts about 40% of the protein from the meal. The residue remains a useful stock-feed.

For details, contact: Officer-in-charge, Dairy Research Laboratory, CSIRO Division of Food Research PO Box 20, Highett, Vic, 3190, Australia.

*(Asia-Pacific Tech-Monitor January-February 1989, 29)*

## BY-PRODUCTS AND WASTE UTILIZATION

### 117 Shrimp processing waste utilization

A substance processed from the discarded shells of prawns, lobsters and other crustaceans is poised to become a wonder drug to arrest haemorrhage and speed up wound-healing.

The substance, "Chitosan", a derivative of the second most abundant natural polymer, chitin, has been cleared for use on humans by the Ethical Committee of the Trivandrum Medical College Hospital following "spectacular results" in a series of animal experiments conducted during the last three years.

The experiments, conducted by Dr.M.Sambasivan, Director and Professor of Neurosurgery in the medical college hospital, and Dr.Radhakrishnan, Pathologist in the Sree Chitra Tirunal Institute of Medical Sciences and Technology, have "conclusively proved" the haemostatic and wound-healing properties of Chitosan.

It was also established that Chitosan was bio-compatible and that there was no side-effect or reaction to this administration, Dr.Sambasivan said.

Excellent Results: Following the Ethical Committee's clearance, Chitosan powder was applied. "with excellent results" on two accident victims who had excessive haemorrhage. In both the cases, haemorrhage was arrested "speedily".



In another case, gauze impregnated with Chitosan was used as a dressing to cover ulcers which healed "very fast".

Both the Chitosan powder and the Chitosan-impregnated gauze were developed and made available to the hospital by the Central Institute of Fisheries Technology (CIFT), Cochin.

Dr.Sambasivan said while the haemostatic and wound-healing properties of Chitosan were known for long, how it acted to stop bleeding or speed up healing was not understood. The Trivandrum experiments could establish the mode of operation of the polymer derivative.

In keeping with the worldwide interest in the potentialities of chitin and Chitosan, the MATSYAFED (Kerala State Fishermen's Co-operative Federation) has set up a pilot plant for their manufacture at Neendakara, Quilon district, one of the major shrimp fishing and processing centres in Kerala. It has an assured supply of the raw material - the skeletal material of shrimps discarded by the fish processing units.

*(Deccan Herald 30 April 1989, 7)*

#### 118 New source of amino acids

A Rs.123 million 100 per cent export-oriented project to produce amino acids from human hair is all set to go commercial, at Abishekapakkam village in the union territory of Pondicherry, with a Japanese concern supplying part of the finance and know-how, and giving an eight-year buy-back guarantee.

The Protchem Industries (India) Limited, a private concern which is entering the share market next month, has launched this ambitious scheme to make amino acids L-cystine and L-tyrosine, besides amino acid powder, used extensively abroad in the pharmaceutical, food processing and cosmetic industries.

Mr.T.K. Mohan and Mr.T.Manoharan, executives at the company, told PTI that while a private concern in Tirupati is currently making a small quantity of L-cystine from human hair, this is the

first time that the technology to make L-tyrosine and amino acid powder is entering the country. It is proposed to manufacture 1,400 tonnes per annum (TPA) of amino acid powder, 84 T.P.A. of L-cystine and 24 T.P.A. of L-Tyrosine. The quantity of human hair required per year is expected to be 1200 tonnes.

Mr. Mohan and Mr. Manoharan say so far human hair is being exported from India to Japan, to make amino acids which have an expanding world market. Protchem's is Japanese collaborator, M/s Union Bros. Industries Inc., had set up three units in Japan and one in Taiwan for the purpose. Human hair has become an important raw material after the killing of whales, another source of animal protein, was banned. West Germany too has this technology.

Explaining the technical process, they said human hair procured from barber shops, is first hydrolysed with hydrochloric acid, then neutralised with chemicals like caustic soda and soda ash. After various pH adjustments, filtration and electrical drying, '100 per cent' pure L-cystine and L-tyrosine is obtained.

A unique feature of the technology is that the disposable effluent is not wasted, but treated to produce a powder containing as many as 19 amino acids. It is first treated in ion exchange towers for iron removal and then sent to an evaporator to turn it into a thick solution. The liquid is sterilised by steam in a sophisticated jacket vessel, and then spray dried, to produce the acid powder. Anti-air and anti-water pollution measures will be taken while disposing off the effluents.

They said the project cost of Rs.123 million would be met through equity capital, loans and shares. Selling at the rate of about Rs.300 per kg of L-cystine, Rs.200 per kg of L-tyrosine and Rs.30 per kg of amino acid powder, they expect a 25 per cent profitability at the present exchange rate for the Japanese Yen. Prices can be revised annually.

(P.T.I. Science Service 8(7), 1989, 1)



## EQUIPMENT AND MACHINERY

## 119 Fuel-efficient grain dryer

Used in grain storage and processing, the Profit Master Grain Dryer is designed to yield high profits because it recycles all the cooling air and 48% of the plenum drying air. It has a grain exchanger to equalise the side to side moisture in the columns, so grain is handled gently and grain quality improved. Heat recycling at the grain exchanger, high efficiency profiled burner, the heat exchanger, and adjustable discharge are said to give this dryer high fuel efficiency and yield profits. It is available with capacities ranging from 14 to 56 T/hr.

For further information write to: QED Dryer Sales and Manufacturing, Inc. 4993 27th Ave, Rockford, Illinois, 61109, U.S.A.

*(Industrial Products Finder 17(6), 1989, 189)*

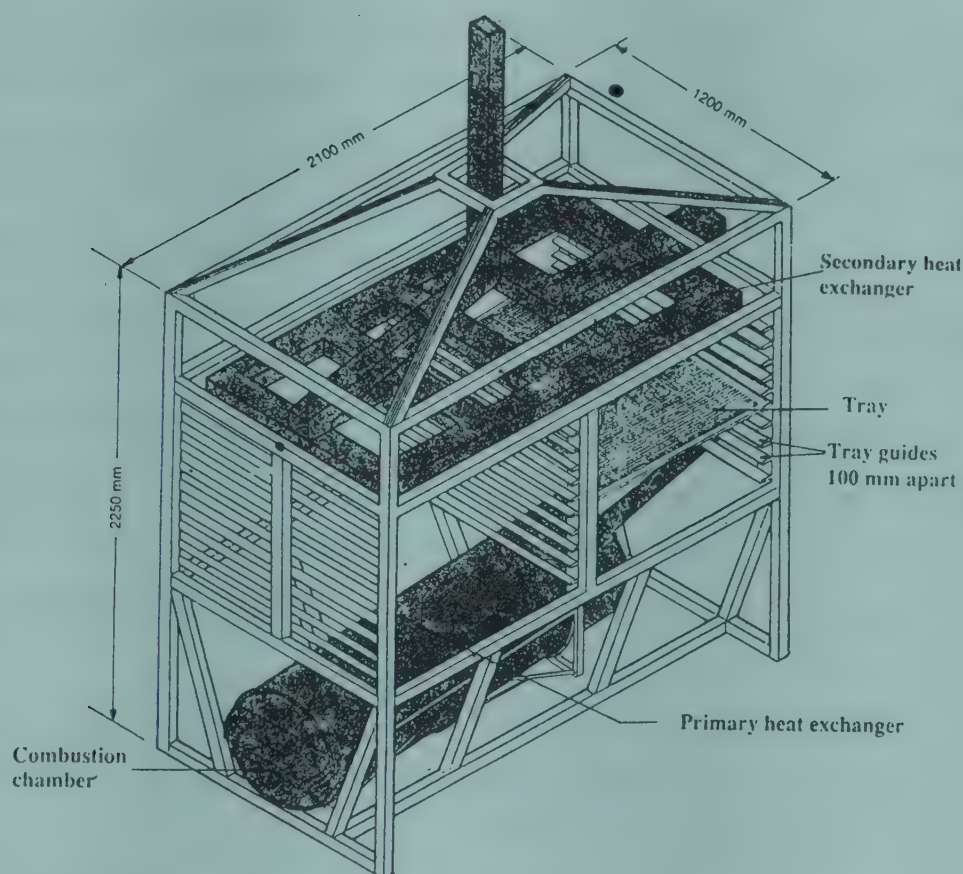
## 120 Agro-waste fuelled root crop dryer

The Phillipine Root Crops Research and Training Centre of the Visayas State College of Agriculture in the Philippines developed a root crop dryer which utilizes agro-waste as fuel.

The dryer basically consists of the furnace chamber which also serves as the primary heat exchanger, the drying chamber and the secondary heat exchanger. The product being dried does not come in contact with the smoke or products of fuel combustion.

Heat needed for drying is supplied by the combustion of fuel in the burning chamber below the trays in the drying chamber. A clearance of 25 cm between the upper surface of the heat exchanger and the bottom trays is provided to avoid damage to the product being dried. During the drying process, ambient air is heated to an average temperature of 60°C on

contact with the outer surface of the drum (primary heat exchanger) and moves up by natural convection. The secondary heat exchanger, consisting of rectangular ducts connected to the primary heat exchanger, is mounted above the drying chamber. It heats up the moisture-laden air from the drying chamber to prevent condensation and to facilitate its exit through the chimney.



Inside structure of the root crop dryer.

One batch of 100 kg fresh root crop chips can be dried on trays within 7-8 h requiring 50-60 kg of coconut husk for fuel. For uniform drying, the trays are alternatively rotated.

The dryer can be used for drying cassava and sweet potato chips as well as other agricultural and marine products with optimum drying results.



As of March 1988, eight prototype of the dryer were being used by root crop processors in the provinces of Samar and Leyte in the Philippines.

For details contact: Philippine Root Crops Research and Training Centre, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

*(Asia-Pacific Tech-Monitor January-February 1989, 29)*

## 121 Spray drying plant

The SSP spray dryers are said to be relatively simple to operate. The slurry is atomised into the dryer chamber in the form of droplets. As these droplets come in contact with hot air, the water is evaporated and powder is formed. Atomisation is carried out either through high pressure nozzles or two-fluid nozzles. The selection of the atomising system is done based on the characteristics of the material to be dried. The dryer ensures flexibility in controlling the powder quality, and has provision for expansion of capacity up to 200%. The SSP spray dryers are used for milk, ice-cream mix, food flavourings, detergents, enzymes, eggs, dyes, tea, coffee, boneglue, dextrose, etc.

For more details write to: Faridabad Stainless and Steel Products Co Pvt Ltd., 19 DLF Industrial Area-II, 13/4, Mathura Road, Faridabad, Haryana 121 003.

*(Chemical Products Finder 7(11), 1989, 98)*

## 122 Dehumidifiers/seed dryers

Bry-Air India Pvt. Ltd. offers the most simple and economical solution for seed drying/storage. The Bry-Air Dehumidifier/Seed dryer maintains perfect conditions for seed drying/storage. The seed dryer is based on the concept of physical adsorption which incorporates a chamber fitted with perforated trays for the seed to be placed and a dehumidifying dryer placed on top of the chamber. The seed dryers can handle

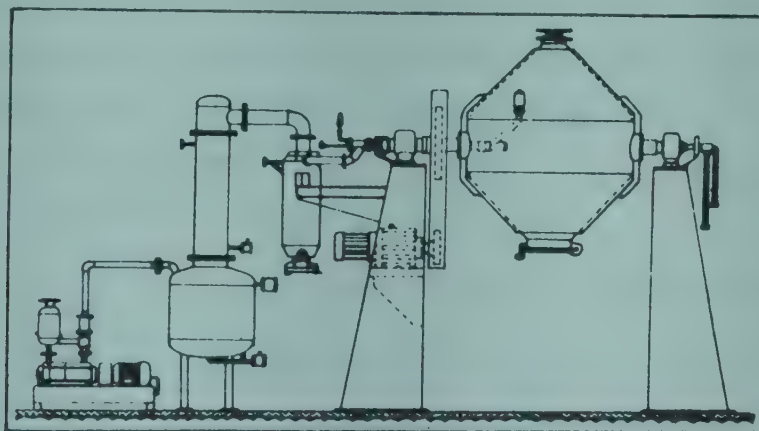
50 to 900 kg of seed per 8 hr. The Bry-Air dryer by maintaining the air at a lower moisture level increases the drying potential and the drying rate. The most advanced technology of desiccant dehumidification has been brought to India by Bry-Air India Pvt. Ltd., a joint venture with Bry-Air Inc., USA. Other products from Bry-Air include MVB dehumidifiers, Heat Recovery Systems, Plastic Dryers, Mold Dehumidification Systems, Material Conveying Systems, Wood Dryers, etc.

For further details contact: Arctic India Sales, 20, Rajpur Road, New Delhi 110 054.

(*Industrial Market Bulletin* 3(4), 1989, 12)

### 123 Rotary cone dryer

This is very useful for uniform and low temperature drying of heat sensitive chemicals and pharmaceuticals, fine chemicals. It has a double conical vessel with rotating system and vacuum solvent recovery system. This equipment being rotating, there is no charring or retention of product. One can change the



product at will. This equipment rotates at very low speed (5 to 15 RPM) resulting in less wear and tear, and requires very little maintenance. This can be used for crystalline products, granules in chemicals, pharmaceutical and food industries. The range is from 250 litres to 3,000 litres capacity. Pilot plant available for trial. Features include: totally sealed and protected from contamination; quick loading and unloading; fast drying, etc.



For more details write to: Bifriends Engineering Works,  
W-73 MIDC Phase II, Manpada Road, Dombivli (East) Dist  
Thane, Maharashtra 421 203.

(*Chemical Products Finder* 7(11), 1989, 98)

#### 124 Food extrusion equipment

Age Technologies has developed a range of equipment for snack and pet food extrusion - to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present, modify or sterilise by-products, and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function. Auxiliary equipment is also available from Age Technologies to clean and mix raw materials, cool extruded products, and apply flavour.

For more details write to: Age Technologies Private Limited, 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.

(*Chemical Products Finder* 7(10), 1989, 61)

#### 125 Multilayer co-extrusion plants

Multilayer plastic packaging is becoming popular for packing milk, edible oils, petroleum products, dairy products, vegetable oils, food products, tea, coffee, etc. The multilayer plastic film has many advantages over conventional packaging materials, viz, low price, good sealability, easy for printing, more shelf life, product visibility for consumer products, pilfer proof, ease of stacking and opening and required barrier properties to retain freshness and the aroma of the product. This has led to the development of multilayer co-extrusion plants. Filmaster Inc, USA, manufactures such plants and has supplied 3 and 5 layer plants all

over the world. Filmaster Inc specialises in manufacturing dies required for multilayer extrusion plants which are vital parts of the plant and its co-extrusion dies are US patented. Filmaster Inc offers multilayer plants in different film widths, suitable for various combinations of plastic raw materials and with semi automatic/automatic controls to cater to a wide range of applications. The film produced on Filmaster Inc plant is FDA approved for storing food stuff.

For further information write to: Square-T Consultant Pvt Ltd., 4/53 Vishnu Prasad, M.G. Road, Vile Parle (E), Bombay 400 057.

(*Industrial Products Finder* 17(5), 1989, 9)

## 126 Packaging machinery

Master manufactures a range of packaging machinery used in pharmaceutical, pesticides, food and chemical industries. The range includes high speed hydrojetting bottle washing machine, semi-automatic round can double seaming machine, stainless steel centrifugal pump, stainless steel gear pump. MLF-R1 fully automatic multi-heads rotary vacuumetric liquid filling machine, MRS-R4 fully automatic multiheads rotary RO/ROPP capping and sealing machine, MGL-1 fully automatic gumming and labelling machine, MGL-2 fully automatic volumetric liquid filling machine, MRS-3 fully automatic RO and ROPP capping and sealing. MGL-3A semi-automatic gumming and labelling machine, automatic bung pressing machine, semi-automatic round can double seaming machine, MLF-3 semi-automatic volumetric liquid filling machine, MVS-1 semi-automatic vial cap sealing machine, hand operated/semi-automatic batch printing machine semi automatic vacuumetric liquid filling machine, bottle brushing machine, semi-automatic bottle washing machine, MRW-1 rotary bottle washing machine, single head automatic crown corking machine, MRT-1 unscrambler, MRS-2 semi-automatic RO



and ROPP can sealing machine, drying ovens, and SS horizontal filter press.

For more details write to: The Master Mechanical Works Pvt Ltd., Pushpanjali, S.V. Road, Santacruz (West), Bombay 400 054.

*(Chemical Products Finder 7(10), 1989, 81)*

127 Highly accurate liquid filling system

Accurate yet low-cost, the EF-100 Series Liquid Filler fills containers of all shapes and sizes. Its features include a programmable microprocessor control, compact design, and easy operation and cleaning. The instrument can fill any flowable liquid from millilitres to gallons with an accuracy to  $\pm 0.5\%$  or better, the firm says. Various available options allow users in food, chemical, packaging, and cosmetic industries to customise the filler to specific requirements.

For further information write to: Adtech, Inc. P.O. Box 135, Rte 113 & Menseh Rd, Skippack, Pennsylvania 19474, U.S.A.

*(Industrial Products Finder 17(7), 1989, 180)*

128 Powder filling machine

Eclat Auto Packs (Pvt) Ltd manufactures fully automatic machine to fill and seal hygienically products in powder form such as tea, coffee, detergents, spices, and pesticides.

For further information write to: Eclat Auto Packs (Pvt) Ltd., 7-1-59 9 A 3, Daram Karan Road, Ameerpet, Hyderabad, Andhra Pradesh 500 016.

*(Industrial Products Finder 17(5), 1989, 118)*

## 129 · Tubular Hand maize sheller

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Function:

Shelling of maize

## Development at

: Central Institute of Agricultural  
Engineering, Bhopal

## Specifications

## Type

: Manual

## Overall dimensions

: 72 mm x 65 mm

## Test Results

## Suitability for crops

: Maize

## Capacity

: 15-23 kg grain/h

## Labour requirement

: One

## Economics

## Cost of equipment

: Rs. 10 (US \$ 0.80)  
-----

Economic Parameter	Operational condition			
	100% custom hire	50% customs hire and 50% sale	100% sale	Self use
Working Capital Rs.	96	528	960	96
Cost of operation, Rs/q Maize (unshelled)	8.85	8.95	9.05	8.85
Break-even-point q/y	5.2	2	1.7	0.8
Annual net profits Rs.	67	370	672	n.a.
Return on invest- ment, %	172	219	226	n.a.
Employment generated, man days/y/ Rs.10,000 of capital investment	7732	1781	1007	n.a.



### Salient Features:

Tubular maize sheller consists of MS tube and 4 Nos. of tapered fins rivetted inside so that inside portion can be used for small or big cob from either side. The maize cob is inserted from one end and rotated in the screwing manner. Remaining half of unshelled cob end is then inserted into the sheller for complete shelling.

Stage of Exploitation : Equipment under commercial production.

For further information contact: Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal 462018 (M.P.).

(*Rural Technology Journal*, December 1988, 25)

### 130 Improved oil expeller

A prototype of an improved oil expeller has been designed and developed at the Mechanical Engineering Research and Development Organisation (MERADO), of the Central Mechanical Engineering Research Institute, Ludhiana.

Most of the 36,000 odd oil expellers now in use in the country have frequent breakdowns and consume more power. The oil content of the cake produced in these expellers ranges from 8 to 12 per cent. The high content of residual oil is attributed to inefficient design, poor manufacturing technology and use of low-grade materials.

In order to increase the amount of oil expelled, a project, for development of a modern oil expeller with a crushing capacity of ten tonnes per day was undertaken at MERADO as part of the technology mission on oilseeds. The prototype developed at MERADO leaves a residual oil of 4 to 6 per cent in the cake and consumes less power than the expellers now in use.

The working life of the wearing components has been improved by choosing proper materials, ensuring proper metallurgical control and using hard face surface coatings. Similarly power transmission efficiency has been improved by redesigning the gear box and auto-lubrication of all friction surfaces.

(*P.T.I. Science Service* 8( 5), 1989, 2-3)

## 131 Tapioca peeler

A machine for peeling the cork layer (skin) of the tapioca tubers has been developed in the Post Harvest Technology Scheme of the Department of Agricultural Processing, College of Agricultural Engineering. The machine consists of a rotor of diameter 25 cm and length 30 cm. The cutting blades have been mounted along the circumference of the rotor with a blade angle of 50°. The machine is powered by 1 HP electric



motor. The capacity of the machine is 9 quintals of tubers per hour. The peeling efficiency and the percentage starch loss while peeling are 85 per cent and 4.5 per cent respectively. The cost of peeling with machine works out to Rs. 1.50 per quintal as against the cost of Rs. 12 per quintal in the conventional method of manual peeling. The saving in cost is found to be 87 per cent. The cost of unit with electric motor is Rs. 3500 each.

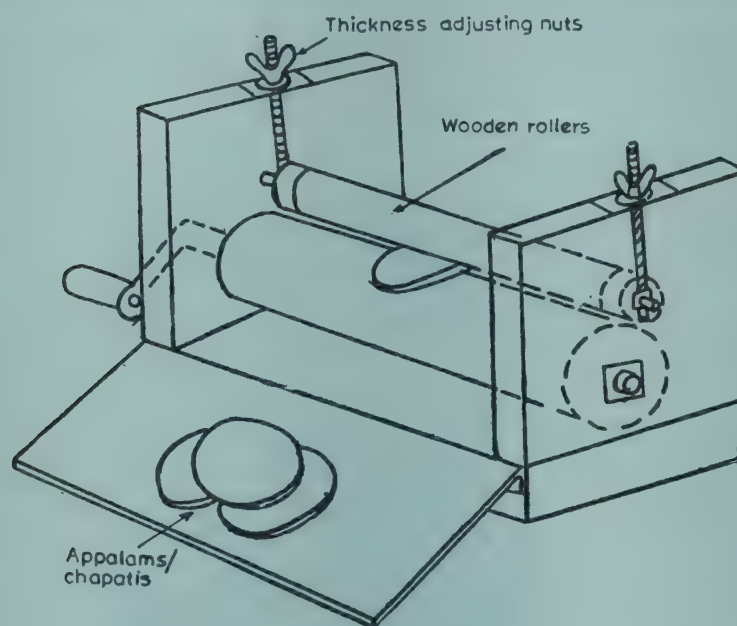
For further information contact: P.T.Palaniswamy, M. Balasubramanian, CT, Devadas and K.R.Swaminathan, College of Agri. Engineering, Coimbatore  
(TNAU News 18(9), 1989, 2)



### 132 Chapati/papad making machine

Here is a simple machine (see sketch) that can be used for making Chapatis/Papad/Appalam speedily and easily.

From grams/wheat powder and water the required paste ball is made fed through the rollers. The small wooden roller



at the top of the big roller (circumference of which is larger than the diameter of appalam) is adjusted by wing nuts to get the required thickness. After two or three feeds, by rotating a hand lever, the required thickness/size of chapati/papad is achieved and the papad is ready for drying and packing.

To avoid sticking of balls on rollers apply vegetable oil and/or dip the ball in wheat or rice flour.

For further information write to: S.Balasubramanian, Plot No.19, Extn. II, V.O.C. Nagar, Thuvagudi, Trichy 620022. (Invention Intelligence 24(3), 1989, 103-4)

### 133 Automated laboratory fermentor

Laboratory fermentors with modern electronic controls are essential in microbiological, biochemical and pharmaceutical research, especially for development and optimization of

fermentation processes in the production of chemicals, antibiotics, enzymes and organic acids. The new modular bench laboratory fermentor is designed for cultivation of micro-organisms in a batch culture to a fully instrumented continuous culture system. Equipped to minimize aseptic preparation and handling, its main vessel is made of pyrex glass cylinder incorporating stainless steel top-plate with ports for various entries. Hollow baffle type heat exchanger serves to control the culture temperature as a baffle and air sparger. Provision for interchangeable sparger and stirrers make this equipment most flexible to handle. Its fully modular electronic control system controls such parameters as rpm, air flow pH, dissolved oxygen, and foam/continuous culture and indicates in a digital meter which can be connected to a recorder.

For further information write to Murhopye Scientific Company, B-11, Metagalli Industrial Estate, Mysore, Karnataka 570 016.

(*Invention Intelligence* 24(4), 1989, 160)

#### 134 Solar energy used for alcohol distillation from sweet sorghum

A pioneering effort on production of industrial alcohol from sweet sorghum using solar energy has been made at Nimbkar Agricultural Research Institute (NARI), Phaltan, Maharashtra.

A pilot plant, the first in Asia, capable of producing between 30-50 litres/day of 90-95% v/v pure industrial grade alcohol, running completely on solar energy, has been set up at the Institute's campus. The plant consists of 38 m<sup>2</sup> flat-plate solar collectors, 2,150 litre hot water storage tank, and 5.5 m long distillation column. Nearly 75% of the total energy required for distillation comes from solar energy, the rest being taken care of by fossil fuel. The project was supported by Department of Non-conventional Energy Sources (DNES), New Delhi.



The innovative feature of the project is the development of complete technology of alcohol production from sweet sorghum, Sorghum bicolor L. (Moench).

Work on sweet sorghum was initiated at NARI in early seventies. The local sorghum varieties were crossed with sweet sorghum germplasm varieties from USA. Thus, at present, NARI has around 20 good varieties and 4 hybrids of sweet sorghum. One can get from these varieties about 2 tonnes/ha/season of grain and 1000-2000 litres/ha/season of alcohol.

Sweet sorghum is an arid region crop and one can have 2 crops/year with much less of water (about 25% only) than is required for sugarcane. NARI scientists have produced varieties which are high sugar yielding and from which excellent jaggery has been produced.

Alcohol from sweet sorghum can replace kerosene for cooking and lighting. Scientists at NARI have already produced efficient lanterns and stoves based on alcohol. "The potential of alcohol from sweet sorghum as automotive fuel is also tremendous".

At present NARI is engaged in designing minidistilleries of 5000 litres/day.

The development of this technology was a team effort. Mr. Rajiv Jorapur and his team were instrumental in developing the distillation technology while Mr. A.R. Ghanekar and Dr. Nandini Nimbkar were responsible for developing sweet sorghum varieties. Efforts are also underway to develop an improved jaggery making technology for sweet sorghum.

(*Invention Intelligence* 24(3), 1989, 110)

### 135 Fruit mill (fruit shredder)

The Temp-X multi-purpose machine is suitable for fruit, dairy and food industries. It can be used for grape cutting in beverage industries; tomato shredding for sauce chatni plants; guava cutting for pulp making; onion shredding for chatni preparation; casein grinding and shredding either wet or dry in

dairy industry; dry fruit cutting to standard pieces in ice-cream plant; and groundnut shredding to fluffy mass for making sweets. With flexible attachment it is possible to shred coconut, potato, cashew nuts, cake and the like. It is also used for mixing dry powder to cereals and tea ingredients. The machine is portable, motorised 1HP x 900 RPM, mounted on a table.

For more details write to: Shriram Temp-X-Changers (India), 991/2/A, GIDC Opp. Makarpura Bus Depot, Vadodara, Gujarat 390 010.

*(Chemical Products Finder 7(10), 1989, 32)*

### 136 Mixing equipment

Navayug Industrials manufactures mixing equipment in SS 316/304. The mixers have 750 to 6,000 RPM due to which substantial saving in reaction time can be achieved. Conventional mixers consume more electricity as it is used to move whole mass. These mixers carry out mixing on unit load which requires less energy ensuring appreciable savings in electricity. Moreover, due to the inbuilt arrangement of blades, the particle size of the end product is maintained as required, which automatically takes care of agglomeration. Maximum possible dispersion also means minimum dispersed raw materials for the same effect. These mixers can be fitted on pressurised or non-pressurised vessels on reaction carried in vacuum. These are used in mixing, dissolving, suspending, homogenising, wet grinding for application in industries such as chemical, pharmaceutical, food and confectionary. These mixers can be used for batch process from 50 to 3,000 litres volume or on continuous process. The company also undertakes manufacture of special purpose stirring arrangements that can be fixed on reaction kettles.

For more details write to: Navayug Industrials, 23 Govt Industrial Estate, Kandivli (West), Bombay 400 067.

*(Chemical Products Finder 7(10), 1989, 63)*



## 137 Hygienic centrifugal pumps

Raj Engineers offers a new series of Hygienic Centrifugal Pumps, suitable for use in food, beverages, breweries, dairy, pharmaceutical, chemical and other process industries. All the components that come in contact with liquids are made out of high quality stainless steel. The bearing frame oil chamber provides constant lubrication to the bearings. When pumping products with high temperature, a steam jacketed cover can be fitted to the transfer cooling system to maintain the product set up. These pumps feature uniformity in overall dimensions and can be changed over from gland packing to mechanical seal with standardised conversion. All pumps are fitted on portable trolley stand with electric motors for easy movement in the plant to connect for ultimate use with other tanks and vessels. They are available or obtainable in nine standard port sizes from 20 to 50 mm, in open, semiopen and closed type impellers having discharge capacities from 6000 to 80,000 LPH.

For more details write to: Raj Engineers, S/3, Raj Rajeshwari Apartment, Narayan Nagar, LBS Marg, Ghatkopar (West), Bombay 400 086.

*(Chemical Products Finder 7(10), 1989, 67)*

## 138 Powder sifter

The Rota-Sift is a centrifugal unit used for the continuous separation of dry or moist materials, even those that tend to ball or agglomerate. It can handle a variety of chemicals, pharmaceuticals, foods, dairy products, animal feed and powders of granules. Material is uniformly fed into the cylindrical sifting chamber by means of a feed screw which discharges the material into a rotating helical paddle. Centrifugal force accelerates the movement of the particles against the screen. The rotating paddles which do not contact the screen, break up soft agglomerates and propel

individual particles through the screen. Oversized particles, hard lumps and trash are ejected and pass directly to the discharge spout. The separating media can be nylon, woven wire meshes or perforated screens. Features include dust-free operation, quiet vibration free action, quick screen change, easy cleanability, and large inspection doors.

For more details write to: Age Technologies Private Limited, 712 GIDC Makarpura, Vadodara, Gujarat 390 010.  
(*Chemical Products Finder* 7(10), 1989, 71)

### 139 Synthetic filter cloth

SIC offers synthetic filter cloth made from nylon, polypropylene, polyester, and HDPE for use in industries such as dyes and chemicals, food and fertilisers, tea and beverages, oils and soaps, paints, cements, etc.

For more details write to: Sigma Industries Corporation, 82, Narayan Dhuru Street, Bombay 400 003.  
(*Chemical Products Finder* 7(10), 1989, 106)

### 140 Filtration in the brewing industry

The filtration of fully fermented beer, following a period in cold storage, is widely practised as a two-stage operation with final sheet filtration. The first or roughing out stage, serves to free the beer from visible turbid matter or, in other words, to take the heavy work load. This operation is best carried out with kieselguhr as the filter medium, in equipment with the capacity to accept the cake that builds up in the course of filtration cycle. The modern filter press is a highly versatile unit, functioning effectively as either a kieselguhr or a sheet filter, with the ability to accommodate both these stages of filtration within a single filter. Carlson washable type W2 support sheets are available for the kieselguhr process. In double form, they are suspended over the outlet collection plate



to capture the filter aid; precoat and filter bed are deposited upon the surface of the W2 sheet and build up in the inlet frames on either side of the outlet plate. The filter is cleaned out at the end of the cycle and the sheets used again. Specially developed for this purpose, W2 sheets are pure cellulose, incorporating wet strength resins within the matrix to improve the durability and produce a high wet strength sheet. The features of the W2 filter sheet support system are: bed stability due to the texture of the supporting medium; the depth effect of the support medium ensures minimal danger of bleedthrough of the finest of fines; and toleration of pressure transients during the filtration cycle. Where aseptic or sterile filling is in operation and the duty is the removal of micro-organisms which must not remain in solution if the beer is to have the required degree of biological stability, filtration should be carried out through sheets from the sterilising group such as NA130 or XE675. Flow rate here would normally be confined to 1.5 hectolitres m<sup>2</sup>/hr. Long term stability of beer have become of greater significance in recent years, and the problem of achieving stability in lighter-flavoured and lighter-coloured beers has made the process even more critical. One of the major approaches to this problem has been by the use of a special sheet viz PROP4 impregnated with polyvinylpolypyrrolidone (PVPP).

For further information write to Pharma Machines Sales and Services, Star Metal Compound, L.B.S. Marg, Vikhroli Bombay 400 083.

( *Chemical Products Finder* 7(11), 1989, 105)

#### 141 Induction cooking system

Induc'Chef, a French system of induction cooking, has recently been marketed after four years of extensive testing in real conditions. In kitchens of hotel management schools or hospitals, in prestigious restaurants or staff canteens,

the induction cooking (based on the principle of production of heat through electromagnetic waves) has conquered the chefs who tested this new material.

Unlike the conventional cooking appliances, where the container is heated by thermal conduction, the induction plate works with power from the mains and heats the food by electromagnetic waves. An inverter transforms the current and creates a magnetic field, which, through contact between the ferrous bottom of the container and a simple copper resistance, produces the heat. Only the bottom and walls of the casserole are heated. As soon as the container is removed from "fire", the plate stops working.

Induction cooking has several advantages: fast cooking (a litre of water can be brought to boil two to four times faster), comfort and hygiene (very little heat emanation in the kitchen), flexible and precise use thanks to the electronic system which allows to select the heating power accurate to within 1 per cent, as well as the duration of cooking by simple pressing on the digital keyboard. The chef, if he so wishes, can shift abruptly from boiling to simmering.

As the plate is not the heating element, the safety of Induc'Chef is total: no risk of burning, nor of fire caused by discharges of hot oil on the appliance. The plate works only if the casserole or dish is of sufficient metallic mass. Combining an exceptional energy efficiency of 92 per cent (70 per cent for electric plates and 50 per cent for gas burners), an immediately available heat and a great flexibility of use, the induction cooking system is a true technical advance.

The production of induction tables for general public has started in 1988, and this year, with a price equivalent of about 15,000 Rupees each, 25,000 appliances are expected to be sold in France only.

(P.T.I. Science Service 8(6), 1989, 15-16)



## PACKAGING

## 142 Film keeps fruit fresh

Shrinkfilm overwrap on fruit and vegetables has enabled a US company to increase sales.

"Spoilage is a big problem with fruits and vegetables", says Ken Johnson, president of Fresh Dimensions, Tempe, Arizona. "Up to 15 per cent of items that reach retailers are lost due to delay, weight reduction, poor quality and appearance. This is not the case with produce wrapped in shrink film".

Mr. Johnson adds that over-wrapping also gives customers a higher quality impression. "In test markets, sales of our potatoes actually doubled after they were wrapped with shrink film".

Fresh Dimensions is using Du Pont's Clysar, an Ildpe film, said to offer high clarity, good shrink characteristics and good moisture and oxygen resistance. It is heat sealed for a tight and secure closure.

For further information write to: Du Pont (UK) Ltd., 105 Wigmore Street, London W1H, OEL tel: 01-408 6362.  
(Packaging News December 1988, 14)

## 143 Specification for flexible packs for edible oils

The Bureau of Indian Standards has brought out an Indian Standard Specification IS: 12265-1987 for flexible packs for packing edible oils. It covers the requirements for flexible pouches made of thermoplastic films or their combinations with other flexible materials used for the retail packing of edible oils in quantities of 100 gm, 500 gm and 1 kg.

To ensure safe carriage of contents in all weather conditions, the Standard provides for stack load test, drop test, and vibration test. Under the stack load test,

the pouches duly filled in and sealed are subjected to a uniformly distributed load for 72 hr at ambient temperature. Thereafter, the pouches are examined for any leakage at the seams or bursting.

The drop test provides that each pouch duly filled in and sealed is to be dropped on a flat, smooth and hard surface from a height of 1.2 m. Each pouch is examined for any leakage after the test.

In the vibration test, the samples of pouches kept on the vibration table are subjected to vibrations for 40 minutes by running a motor, and any leakage of oil through the seams is observed either during or after the test.

The shelf life of contents packed in pouches is specified as 120 days.

(*Invention Intelligence* 24(4), 1989, 158)

## ANALYSIS

### 144 New light on bitter taste

Bitter tastes are rather different from the other kinds of taste we perceive sweet, salty or sour. Not only are they less pleasant, even at low concentrations, but they help us to avoid hazardous foods.

The surface of the tongue responds electrically to sweet salty or sour tastes, the electrical change results in a response in the gustatory (tasté) nerve. But bitter tastes provoke no such currents.

Now researchers, Mike Akabas and his colleagues at Columbia University (New York) have found that bitter tastes result in a rise in calcium concentration inside some cells. The researchers first separated out groups of cells from the



tongues of rats. They then identified them as taste cells by measuring the response of the cells to a change in the electrical potential across their membranes. The taste cells but not other cells on the tongue responded by producing electric current across the membrane.

The researchers then looked at how the cells responded to bitter tastes, using denatonium chloride, a substance that tastes extremely bitter to humans. One or two cells in each group responded to denatonium by doubling their levels of calcium whereas the other taste cells did not. None of the cells responded with a change in calcium to a sweet stimulus, so the response received specific to bitter taste.

The levels of calcium inside nerve cells normally rise when there is a change in electrical potential across the membrane. The rise in calcium, in turn leads to the release of a neurotransmitter that the researchers suggest delivers a 'bitter' message to the gustatory nerve, but the responsive cells differed from ordinary nerve cells; changes in electrical potential, the researchers found, made no difference to those cells. Calcium levels rose regardless of a change on potential.

The detection of bitter tastes, the researchers suggest, relies on biochemical changes inside the taste cells, instead of the more usual electrical changes. Molecules of the bitter substance probably attack receptors on the membrane of taste cells, once attached, they could activate a chemical message inside the cells, which promotes the release of calcium. Whatever that chemical message is, it makes bitter substances taste different.

*(Chemical Weekly 34(35), 1989, 83)*

## COMMERCIAL INTELLIGENCE

## PRODUCTION (Raw Material)

## 145 Ginger production

India is the largest ginger-producing nation in the world, accounting for about 50 per cent of the world's total production.

India is the largest exporting country also and earns a considerable sum in foreign exchange.

Prior to 1974-75, India did not export ginger oil. In 1975 the export was only 100 kg but rose to 15 tonnes in 1985, earning foreign exchange worth Rs. 1.2 crore.

*(The Times of India 26 April 1989, 9)*

## 146 Milk production up

Milk production in the country has gone up to 46.1 million tonnes in 1987-88. Correspondingly, per capita availability has also gone up from 132 grams per day to 158 grams per day.

This spectacular success is mainly due to Operation Flood (OF).

The recent decision to set up a technology mission for dairy development headed by the National Dairy Development Board Chairman, Mr.V.Kurien, is a clear indication of the Centre's determination to build upon the experiences accrued from OF I and II. The mission, through OF III, envisages raising the total milk production to 61 million tonnes and the per capita net availability to 186 grams per day by 1995. By that time, the milk yield of cows will be increased by 64 per cent from 390 litres to 640 litres and that of buffaloes by 12 per cent from 910 to 1,020 litres per year. In the long run, the government hopes to increase production to 70 million tonnes a year by 2000 AD to meet the projected demand of 60 million tonnes.



Under the mission, the number of cooperatives would increase from 49,007 in 1987 to 70,000 through OF III, and the state governments would be asked to organise an additional 80,000 cooperatives, thus covering 270 districts by the middle of the next decade. Daily milk procurement is expected to virtually double to 15 million litres and milk marketing would rise by 74.42 per cent to 15 million litres from the present 8.6 million litres. The processing capacity will also be raised to 22 million litres by 1995 against 11.7 million litres in 1987. (*Economic & Commercial News* 19(7), 1989, 13)

## EXPORT

### 147 Cashew kernels export slumps

India's export of cashew kernels declined to 31,892 tonnes during January-December, 1988 from 38,598 tonnes in the previous year.

Similarly, export earnings also decreased to Rs. 257.27 crores from Rs. 340.29 crores during the period under review. The unit price realised was only Rs. 80.67 per kg compared to the previous year's Rs. 88.16.

Strong competition from Brazil, lower imports of raw cashew and fall in kernel prices in the international market and Kerala Government's monopoly procurement were the reasons for the poor export performance.

(*Financial Express* 25 March 1989, 8)

### 148 Chillies export

Pakistan is likely to import 5,000 tonnes of chillies immediately for which it had made enquiries with India.

The enquiries followed reports of a possible 60% damage to chilli crop this season in Pakistan owing to a mysterious disease according to "Spices Market", a weekly publication of the Spices Board.

(*Financial Express* 25 March 1989, 8)

## 149 Export of dry chillies from India .

Year	Quantity (Metric tons)	Value ( 000 Rupees)
1985-86	1241.1	20202.9
1986-87	4327.0	49580.0
1987-88	6122.0	83345.0

Source: Customs Lists

(*Spices News Letter* 23(3), 1989, 34)

## 150 Marine goods export up by 11 p.c.

Sea food exports touched an impressive figure of Rs.5,900 million during 1988-89 despite stiff competition from Asian rivals including China, Thailand and Taiwan. This compares with exports worth Rs. 5,312 million in 1987-88 and represents an increase of 11 per cent.

This is the third consecutive year that the export of these products have maintained a steady rise. Marine products are one of the 14 thrust items identified for export.

Export of marine products peaked to Rs. 5,312 million in 1987-88. In the previous year, 1986-87, exports were Rs.4606.7 million. In terms of quantity, exports increased from 85843 m.t. in 1986-87 to 97179 m.t. in 1987-88 and during 1988-89 quantity-wise exports from April to January 1989 increased by 6.28 per cent.

Frozen shrimps constitute a major portion of India's exports of marine products accounting for a share of 57 per cent, while the other items are frozen lobsters, frozen cuttlefish and fillets, frozen squids, dried fish, shark fish and fish maws. Japan has been the largest market followed by US, the UK, France, Spain, Singapore, Netherlands and Sri Lanka (*Economic and Commercial News* 19(17), 1989, 3-4)



## 151 Betal leaves

Export of betal leaves from India in 1987/88 was worth Rs.17 lakhs, the minister of State for Commerce, Mr.Dasmunshi informed the House.  
(*The Economic Times* 29 April 1989, 6)

## 152 HPS groundnut exports

After more than a decade, India is again making its presence felt significantly in the world market for HPS (hand picked selected) groundnut.

In the current year, this traditional item of export is expected to fetch over Rs.100 crores. This would be a record export earning as last year the commodity could hardly earn Rs.5 crores in foreign exchange.

Till March 31, export contracts for 52,000 tonnes valued at about Rs. 46 crores have been concluded. Exporters here feel that another 50,000 tonnes could be easily be sold in the current year.

This is possible as the country has a bumper crop this year following good monsoon. The Saurashtra region, known as the groundnut bowl of the country, received adequate rainfall during the season.

Out of the total kharif oilseed output of 88 lakh tonnes, 75 lakh tonnes were groundnut (in shell). The rabi crop is estimated at 20 lakh tonnes (in shell) making the season's total groundnut production 77 lakh tonnes.

Due to good weather, the quality of the nut produced is good and also free from aflatoxin, a major problem about which the foreign buyers are more concerned. According to reports reaching here from overseas centres, buyers are quite satisfied with the quality of Indian goods.

A significant development this year is the exploitation of new markets. The export monitoring agency for HPS groundnut - the Indian Oil and Produce Exporters Association (IOPEA) has initiated a vigorous drive to tap non-traditional markets.

An IOPEA delegation which visited for eastern countries recently made contracts for exporting substantial quantity to non-traditional markets.

Last November, the Government gave five per cent cash compensatory support (CCS) for HPS groundnut. However, exporters here feel that it is too inadequate. IOPEA has already sought increased rate of CCS in view of the bright export prospects.

During 1975-76, Indian export of HPS groundnut were at its peak - about two lakh tonnes valued at Rs.100 crores then. That was the golden period when India had 40 per cent share in the world market.

(Financial Express 4 April 1989, 11)

### 153 Export potential of deoiled meals to far East

Far eastern markets offer a great potential for the export of deoiled meals from India during the current years as China, the major supplier of these markets, is passing through serious drought conditions.

Further, China is developing its feed milling industry, therefore, its export of protein material is expected to gradually come down to far Eastern countries in next two to three years

These are some of the findings of a high level delegation of the Solvent Extractors Association of India, led by association president Mr. H.P. Gupta. The 7-member mission sponsored by the Union ministry of commerce had visited Singapore, Kuala Lumpur, Jakarta, Manila, Tokyo, Seoul; Taipei, Hong Kong, Bangkok and Colombo during its three-week extensive tour, during which they met nearly 200 representatives of feed millers, importers and government officials.

The objective of the mission was to study the feed mill industry in those countries and explore the markets for Indian deoiled cakes (extractions) and also to study the latest technology developed in vegetable oil industry in far East countries.



There was small export of Indian deoiled cakes to some of these countries, but many of the large importers were not aware of our capabilities of supplying various protein materials ranging from 16 per cent profit in rice bran extraction to 54 per cent in groundnut extraction. As a matter of fact India is the only country which has the largest basket of protein supplements at different protein levels and at varying price levels to suit every feed millers' requirement, according to SEA delegation.

Further, Indian oilseeds crop has increased substantially enabling it to become a potential supplier of proteins, provided the country can maintain quality, regular shipment and continuous liaison with feed millers and importers of deoiled meals. This is the right time for India to capture the far Eastern markets and the government should not hesitate in granting 20 per cent CCS on export of deoiled meals to penetrate in these new markets, the mission suggests. (*The Economic Times* 13 April 1989, 3)

#### 154 Registration with Spices Board

The government has made it compulsory for exporters of spices and cardamom to register their contracts with the Spices Board, Ernakulam.

Exporters, who are already registered with the Spices Export Promotion Council and the Cardamom Board, holding valid registration-cum-membership certificates issued by them will be deemed to have been registered with the Spices Board. Renewal of the certificates will be decided by the Spices Board, according to a recent trade notice issued by the chief controller of imports and exports.

The importance of monitoring of spices exports can hardly be overemphasised in view of our rapidly growing overseas trade as also the increasing competition in the international markets.

(*The Economic Times* 22 April 1989, 6)

## 155 Cell for exporters' grievances

A general clearing house system to process grievances of exporters is proposed to be set up. It will comprise representatives of the Federation of Indian Export Organisations (FIEO) and the office of the Joint Chief Controller of Imports and Exports (JCCI and E)

Mr. Tejendra Khanna, Chief Controller of Imports and Exports (CCI and E), said this would provide for greater interaction between exporters and governmental agencies and the members could meet every 15 days to sort out various procedural bottlenecks.

Assuring the participants support services, Mr. Khanna said the present delays would be cut down with thrust on services to the exporter.

Pointing out that exim policies had several "angles and tangles" he said it was clear that all support should be given to the exporting community.

On exporters complaints over classification problems for the purpose of determining cash compensatory support (CCS), Mr. Khanna said with both the Commerce and Finance Ministries agreeing to the harmonisation between trade and customs classifications, a common code for trade and customs policies should be evolved within the next three to four months.  
(Financial Express 7 March 1989, 1)

## TRADE INFORMATION

## 156 New BIS offices established

Four new offices of the Bureau of Indian Standards (BIS) have been established at Faridabad, Ghaziabad, Coimbatore and Vadodara to strengthen certification and propagation of standardisation and quality systems at different industrial centres in the country.



This was stated by Mr. Sukh Ram, Minister of State for Food and Civil Supplies, while presiding over the fourth high-level meeting of the Bureau here on Wednesday

He said a branch office of BIS is also proposed to be opened at Srinagar shortly.

(*Financial Express* 25 May 1989, 10)

#### 157 National fisheries board to be set up

The Government has decided to set up a National Fisheries Development Board on the pattern of the National Dairy Development Board with the aim of giving a boost to the marine industry with its high potential for exports.

Despite the country having a 1,715 km-coastline and over 2 million square kilometres as its exclusive economic zone, the fishing sector is in troubled waters. Barely 42 per cent (about 1.9 million tonnes) of the annual marine catch potential of 4.5 million tonnes is being exploited and, of this, only 5.25 per cent is exported.

In 1987-88, shrimps accounted for over 57 per cent in quantity and a whopping 80.15 per cent in value of India's marine exports. As a result export earnings have largely hinged on the international prices for shrimps.

While the value of shrimp exports has risen by 29 per cent between 1985-86 and 1987-88, the actual rise in the quantity exported during the same period was only 10.7 per cent. (*Deccan Herald* 9 March 1989, 14)

#### 158 International Spice Group office

The office of the International Spice Group (ISG), a body constituted under the aegis of the International Trade Centre (ITC), Geneva and the Commonwealth secretariat, will be located in Cochin, reports UNI & PTI.

This was decided at the second meeting of the group held in Singapore from March 6 to 11.

Union commerce ministry joint secretary Sivaraman and Spices Board chairman K.M. Chandrasekhar were among a five-member delegation which represented India at the meeting.

The meeting considered the current functioning of the ISG in the light of the wish of the Commonwealth secretariat and the ITC to hand over the secretariat responsibility to the group.

*(The Economic Times 16 March 1989, 3)*

159 Broad-banding for processed foods

The Union Government has brought all fruit and vegetable products along with processed foods, excluding the items reserved for small sector, under the broad-banding scheme in its bid to simplify procedures and policies, to encourage greater flexibility in production and help in the utilisation of capacity. Fruits and vegetable products and other processed foods under the purview of Scheduled Industry 27(1) and 27(5) of the First Schedule of 1(DR) Act, 1951, will be covered under the scheme.

The broadbanding facility will be available to all industrial undertakings, including MRTP/FERA companies.

*(Industrial Products Finder 17(6), 1989, 113)*

160 Tax policy on processed food

Processed food is not a luxury item and taxation policies should be re-oriented keeping this in focus according to a study conducted by the PHD Chamber of Commerce and Industry, reports UNI.

The study says that it is essential to recognise that processed food is a food item meant for mass consumption. Re-orientation of policies based on this recognition would give the necessary fillip to the industry.



The study pointed out that some of the main constraints faced by the industry were the high cost of raw materials in view of the low agriculture productivity, high incidence of taxation ranging from 30 to 60 per cent on the finished products, high cost of packaging which accounts for about 20 per cent of the exfactory price of some finished products, low technology base and inadequate infrastructural facilities. (The Economic Times 17 April 1989, 5)

#### 161 Consignment tax on biscuit

Federation of Biscuit Manufacturers of India (FBMI) has expressed concern over the proposed Consignment Tax (CT). The Federation states that not much attention has been paid to the severe economic consequences of raising revenue by this form of tax. The proposed consignment tax may collect some Rs. 2000 crores yearly from the public against around Rs. 3660 crores of income tax.

According to Mr. S.P. Chauhan, president, FBMI consignment tax like Central Sales tax, will be imposed at four per cent whenever there is an interstate movement. Thus, a factory in state A will have a four per cent price advantage in its own state versus a competitor from state B. In state B, the position gets reversed. So, to be competitive, both companies will need factories in both states. Therefore, a company selling its products nationally will need 30 factories, one each for 30 states and Union territories.

He said, CT was thus an interstate tariff barrier, fragmenting markets and therefore industries. Such industries cannot reap economies of scale. Cost per unit of output and therefore price to the public will go up.

Mr. Chauhan said besides making our industries uncompetitive abroad, CT will restrict domestic competition to the detriment of the consuming public. This is because manufacturers with small market shares cannot afford viable factories in other states and therefore will get priced out of them. (*The Economic Times* 13 April 1989, 3)

162 Credit facility under Modvat extended

The notional credit facility under the Modvat scheme for user industries has been extended up to March 31, 1990. The scheme was earlier applicable up to March 31, this year, according to an official release.

Under the Modvat scheme, the duty paid on inputs is available as credit for payment of duty on the finished products. The extent of credit is equal to the duty actually paid on the inputs.

For inputs received from small-scale units, which have discharged duty at a concessional rate (under the general small-scale exemption scheme), the user industry is allowed to take a notional higher credit of five per cent ad valorem.

The government had earlier notified that this facility of taking notional higher credit would be in force up to and inclusive of March 31, 1989. It has now decided to extend the facility for one more year.

(*The Economic Times* 3 April 1989, 1)

163 Financial assistance to fruit and vegetable processing industry

Food processing: The Government has made a plan provision of Rs.1.6 crores for 1989-90 for providing financial assistance to State Governments and co-operatives for the development of fruit and vegetable processing industries.

The Minister of State for Food Processing Industries, Mr. Jagdish Tytler, told the House in a written reply that the



Government had not provided any financial assistance to encourage and promote the industry in the special category States in 1988-89.

(*Financial Express* 7 April 1989, 6)

#### 164 Technology Mission on dairy development

The Government has decided to establish a Technology Mission on Dairy Development.

The major objective of the Mission would be to consolidate the achievements of the cooperative dairy sector using the infrastructure already established under Operation Flood taking the milk production 61 million tonnes by 1995 from the level of 44 million tonnes in 1986-87. With this, the per capita availability of milk would go up from 158 gms/day in 1986-87 to 186 gms/day in 1995.

This was disclosed in the Rajya Sabha recently by the Minister of State for Agriculture, Mr. Shyam Lal Yadav.

The Mission would aim at extending the dairy cooperative structure to 270 districts by 1995 and improving average annual yield of milk per animal within the project area.

In line with the National Breeding Policy, the Technology Mission will lay stress on improving milk production through upgrading of nondescript Indian buffaloes and selective breeding of important breeds of cow and buffaloes; cross breeding of nondescript cattle with exotic breeds; development of acceptable system of culling of inefficient animals; and adoption of improved technologies like frozen semen, embryo transplant, genetic engineering etc. for gaining quicker results.

(*Economic and Commercial News* 19(12), 1989, 11-12)

#### 165 West German market for spices - information source

The German Market for Spices on 84-page booklet giving up-to-date information about the spice trade and requirement in West Germany, has been published by the Indo-German Chamber of Commerce. Priced at Rs.75, it gives distribution

system, trade requisition, West German Food Laws, specific trade fairs and list of importers and associations for building up trade contacts.

West Germany is the largest market for spices in Europe and the second largest in the world after USA. Consumption trends indicate pepper is still the main item imported in terms of both quantity and value, followed by paprika, nutmeg and cumin. By any standard, this booklet is a valuable reference book for exporters in India.

(*Chemical Weekly* 34(27), 1989, 82)

166 Process for producing fat and cholesterol-free meat

An Australian breakthrough in meat processing, said to reduce fat levels in meat by 96% and cholesterol levels by at least 30%, has attracted interest from several of the world's major food processors. Executives from a Japanese food processing company have visited Chapman Meats (Australia) in Adelaide last November to study and evaluate the process developed by the company. The first international showing of the company's new range of meat products was at Foodex in Tokyo in March 1988, followed by a display at the Food Marketing Institute's Convention in Chicago in May 1988. The company offers manufacturing licence rights.

(*Chemical Weekly* 34(27), 1989, 82)

167 Food processing prospects

Several foreign companies especially from the US, West Germany and Italy are keen on joint ventures in the field of food processing, Mr. Jagdish Tytler, Minister for Food Processing Industries said here.

Mr. Tytler said these firms have sought Government's permission and his Ministry is studying the proposals and will be cleared on merit.

The Minister was speaking after inaugurating the new food division of Parle Exports.



Later in an informal chat with newsmen, Mr. Tytler said the Coca Cola proposal would be cleared if they offered the same commitments as offered by its competitor, Pepsi.

The Minister said the Government is considering further fiscal reliefs to food processing industry. The processed foods need to be given tax reliefs as various duties on them now accounts for over 55 per cent of their selling price. His Ministry would take up this matter with the Finance Ministry, he said.

The Food Processing Ministry is currently undertaking several projects which would result in a saving of about Rs.2000 crores in a couple of years. These are in the areas of better packing for fruits and vegetables, procuring fruits and vegetables from farmers especially in hilly and remote areas, encouraging processing of seasonal fruits and vegetables.

In this context, the Minister also said that the Government is encouraging the setting up of high-tech cold storage unit in the private sector with foreign technical collaboration. (*Financial Express* 16 April 1989, 1)

## FOOD REGULATION, QUALITY CONTROL AND HYGIENE

### 168 Rice milling industry (Regulation and Licensing) Amendment Rules, 1988

G.S.R. 807 (E) Amendment Rules 1988:- Whereas the draft of certain rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, was published as required by sub-section (1) of section 22 of the Rice Milling Industry (Regulation) Act, 1958 (21 of 1958) in the Gazette of India Extraordinary Part II Section 3, sub-section (i) dated the 28th April, 1988, under the notification of the Government of India in the Ministry of Food and Civil Supplies

(Department of Food) No.G.S.R.512(E) dated the 28th April 1988, inviting objections or suggestions from all persons likely to be affected thereby before the expiry of a period of forty-five days from the date on which the copies of the Official Gazette in which the said notification was published were made available to the public;

And, whereas, the said Gazette was made available to the public on the 11th May, 1988;

And whereas, the objections and suggestions received from the public on the said draft have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by Section 22 of the said Act, the Central Government hereby makes the following rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, namely:-

1.(1) These rules may be called the Rice Milling Industry (Regulation and Licensing) Amendment Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Rice Milling Industry (Regulation and Licensing) Rules, 1959, in the Schedule, in Form IV, in clause 3 in condition (3D) -

- (i) in the first proviso, for that words "thirteen years and three months", the words "sixteen years and three months" shall be substituted;
- (ii) in the second proviso, for the words and figures "31st July, 1988", the words and figures "31st July, 1991" shall be substituted.

(File No.15/2/88-D&R.I)

N.P.NAWANI, Jt.Secy.

(The Gazette of India No.400, Part II-Section 3-sub-section (i), 1988, 2)



## 169 Child labour (Prohibition and Regulation) Rules 1988

G.S.R.847(E):- Whereas the draft of certain rules was published as required by sub-section (1) of section 18 of the Child Labour Prohibitions and Regulation) Act, 1986 (61 of 1986), in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 8th October, 1987, under the notification of the Government of India in the Ministry of Labour, No.G.S.R. 845(E), dated the 8th October, 1987, inviting objections and suggestions from all persons likely to be affected thereby till the expiry of a period of thirty days from the date of publication of the said notification in the Official Gazette;

AND WHEREAS the said Gazette was made available to the public on 4th November, 1987;

AND WHEREAS the objections and suggestions received from the public on the said draft have been considered by the Central Government.

NOW THEREFORE, in exercise of the powers conferred by sub-section (1) of section 18 of the said Act, the Central Government; hereby makes the following rules, namely:-

1. Short title and commencement: (1) These rules may be called the Child Labour (Prohibition and Regulation) Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions:- In these rules, unless the context otherwise requires -

- (a) "Act" means the Child Labour (Prohibition and Regulation) Act, 1986 (61 of 1986);
- (b) "Committee" means the Child Labour Technical Advisory Committee constituted under sub-section (1) of section 5 of the Act;
- (c) "Chairman" means the Chairman of the Committee appointed under sub-section (2) of section 5 of the Act;

- (d) "Form" means a Form appended to these rules;
- (e) "register" means the register required to be maintained under section 11 of the Act;
- (f) "Schedule" means the Schedule appended to the Act;
- (g) "section" means a section of the Act.

3. Term of office of the members of the Committee; (1) The term of office of the members of the Committee shall be one year from the date on which their appointment is notified in the Official Gazette;

Provided that the Central Government may extend the term of office of the member of the Committee for a maximum period of two years;

Provided further that the member shall, notwithstanding the expiration of his term continue to hold office until his successor enters upon his office.

(2) The members appointed under sub-rule (1) shall be eligible for reappointment.

4. Secretary to the Committee: The Central Government may appoint an officer not below the rank of an Under Secretary to the Government of India as Secretary of the Committee.

5. Allowances to non-official members: The non-official members and Chairman of the Committee shall be paid such fees and allowances as may be admissible to the officers of the Central Government drawing a pay of rupees four thousand five hundred or above.

6. Resignation (1) A member may resign his office by writing under his hand addressed to the Chairman.

(2) The Chairman may resign his office by writing under his hand addressed to the Central Government.

(3) The resignation referred to in sub-rule (1) and sub-rule (2) shall take effect from the date of its acceptance or on the expiry of thirty days from the date of receipt of such resignation, whichever is earlier, by the Chairman or the Central Government, as the case may be.



7. Removal of Chairman or member of the Committee: The Central Government may remove the Chairman or any member of the Committee at any time before the expiry of the term of office after giving him a reasonable opportunity showing cause against the proposed removal.

8. Cessation of membership: If a member :-

- (a) is absent without leave the Chairman for three or more consecutive meetings of the Committee; or
- (b) is declared to be of unsound mind by a competent court; or
- (c) is or has been convicted of any offence which, in the opinion of the Central Government involves moral turpitude; or
- (d) is, or at any time, has been adjudicated insolvent or has suspended his debts or has compounded with his creditors, shall cease to be a member of the Committee.

9. Filling up of casual vacancies: In case a member resigns his office under rule 6 or ceases to be a member under rule 8, the casual vacancy thus caused shall be filled up by the Central Government and the member so appointed shall hold office for the unexpired portion of the term of his predecessor.

10. Time and place of meetings: The Committee shall meet at such times and places as the Chairman may fix in this behalf.

11. Notice of meetings: The Secretary of the Committee shall give at least seven days notice to every member of the Committee of the time and place fixed for each meeting along-with the list of business to be transacted at the said meeting.

12. Presiding at meetings: The Chairman shall preside at every meeting of the Committee at which he is present; if, however, the Chairman is unable to attend a meeting, any member elected by the members present among themselves shall preside at the meeting.

13. Quorum No business shall be transacted at a meeting of the Committee unless at least three members of the Committee other than the Chairman and the Secretary are present:

Provided that at any meeting in which less than three of the total members are present, the Chairman may adjourn the meeting to a date as he deems fit and inform the members present and notify other members that the business of the scheduled meeting shall be disposed of at the adjourned meeting irrespective of the quorum and it shall be lawful to dispose of the business at such adjourned meeting irrespective of the number of members attending the meeting.

14. Decision by majority: All questions considered at a meeting of the Committee shall be decided by a majority of votes of the members present and voting and in the event of equality of votes, the Chairman, or in the absence of Chairman, the member presiding at the meeting, as the case may be shall have a second or casting vote.

15. Sub-Committees: The Committee may constitute one or more Sub-Committees, whether consisting only of members of the Committee or partly of members of the Committee and partly of other persons as it thinks fit, for such purposes, as it may decide and any Sub-Committee so constituted shall discharge such functions as may be delegated to it by the Committee.

16. Register to be maintained under section 11 of the Act;

(1) Every occupier of an establishment shall maintain a register in respect of children employed or permitted to work, in Form A.

(2) The register shall be maintained on a yearly basis but shall be retained by the employer for a period of three years after the date of the last entry made therein.

17. Certificate of age: (1) All young persons in employment in any of the occupations set-forth in Part A of the Schedule or in any workshop wherein any of the processes set-forth in Part B of the Schedule is carried on, shall produce a certificate of age from the appropriate medical authority, whenever required to do so by an Inspector.



(2) The certificate of age referred to in sub-rule (1) shall be issued in Form 'B'

(3) The charges payable to the medical authority for the issue of such certificate shall be the same as prescribed by the State Government or the Central Government, as the case may be for their respective Medical Boards.

(4) The charges payable to the medical authority shall be borne by the employer of the young person whose age is under question.

Explanation for the purposes of sub-rule (1), the appropriate "Medical Authority" shall be Government medical doctor not below the rank of an Assistant Surgeon of a District or a regular doctor of equivalent rank employed in Employees' State dispensaries or hospitals.

#### FORM 'A'

(See rule 16(1))

Year.....

Name and address of employer..... Place of work.....

Nature of work being done by the .....  
establishment

Sl. No.	Name of Child	Father's Name	Date of Birth	Permanent Address	Date of joining the establishment
---------	---------------	---------------	---------------	-------------------	-----------------------------------

1	2	3	4	5	6
---	---	---	---	---	---

Nature of work on which employed	Daily hours of work	Intervals of rest	Wages paid	Remarks
----------------------------------	---------------------	-------------------	------------	---------

7	8	9	10	11
---	---	---	----	----

## FORM "B"

## (CERTIFICATE OF AGE)

(See rule 17(2))

Certificate No.....

I hereby certify that I have personally examined (name)  
 .....son/daughter of .....  
 residing at.....and that he/she has  
 completed his/her fourteenth year and his/her age, as nearly  
 as can be ascertained from my examination, is .....years  
 (completed). His/her descriptive marks are.....  
 .....

Thumb-impression/signature of Child.....

Place.....

Date.....

Medical Authority  
 Designation  
 (File No.S-27025/59/86-CL)  
 Director

(MEENA GUPTA)

{The Gazette of India No.429, Part II - Section 3-sub-section  
 (1), 1988, 4-6}

## 170 Spices Cess Rules, 1988

G.S.R.696(E)- In exercise of the powers conferred by  
 section 5 of the Spices Cess Act, 1986 (11 of 1986), the  
 Central Government hereby makes the following rules, namely.

1. Short title and commencement (1) These rules may be called  
 the Spices Cess Rules, 1988.

(2) They shall come into force on the date of the publication  
 in the official Gazette.

## 2. Definitions:

In these rules, unless the context otherwise requires -

(a) "Act" means the Spices Cess Act, 1986 (11 of 1986)



- (b) "Cess" means the duty of customs leviable under the Act;
- (c) "Form" means a form appended to these rules:
- (d) Words and expressions used and not defined in these rules but defined in the Act shall have the meanings respectively assigned to them in the Act

### 3. Furnishing of Statistical Information -

- (1) Every exporter of spices shall furnish to the Spices Board every month a statistical information on export and cess paid on spices in the form and shall be verified by means of a declaration signed by the exporter of spices.
- (2) The Statistical information in the form shall be furnished to the Spices Board on or before tenth of each succeeding month.

F.No.1/33/87-EP(AGRI.V))

M.R.SIVARAMAN, Jt. Secy.

### FORM

(See rule 3)

STATISTICAL AND OTHER INFORMATION FOR THE MONTH OF .....19,  
IN RESPECT OF SPICES/SPICES PRODUCTS EXPORTED AND CESS PAID.

Name & Full Address  
of the Exporter.....

Month:

(Based on date of shipment)

Telegraphic Address:

Spices Board Registration....

Telephone No.

Certificate number.

Telex No.

Date.....

Sl. No.	Number & Date of shipping bill passed	Date of shipment	Mode of shipment (by Sea/Air/Land)	Indian port of Export	Foreign port of Import	Country of Import
1	2	3	4	5	6	7

Name of Spice/ spice product	Statutory Grade	Brand name if any	Unit of packing			Total Quantity (Kgs.)
			Kgs	Grams	No. of Packets	
			(a)	(b)	(c)	
8	9	10		11		12
<hr/>						
Total FOB Price (Rs.)	FOB Unit Price (Rs./Kg.)	Rate of Export Cess	Total Export Cess Paid (Rs.)	Rate of Export duty	Total Export duty paid (Rs.)	
13	14	15	16	17	18	
<hr/>						

I/We declare that the information given above are true to the best of my knowledge and Belief.

Place:

SIGNATURE OF EXPORTER

Date:

(Office Seal)

Note:- Separate entry shall be made for each spice or spice products and grading thereof.

(The Gazette of India No.326, Part II-Section 3- Sub-section(i) 1988, 3-4)

# 171 Ginger Grading and Marking (Amendment) Rules 1988

G.S.R. 8 - Whereas certain draft rules further to amend the Ginger Grading and Marking Rules, 1964, were published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act,



1937 (1 of 1937), under the certification of the Government of India, Ministry of Agriculture (Department of Rural Development) G.S.R. number 207 dated the 3rd March, 1988, at pages 848-852 in the Gazette of India, Part-II, Section 3, Sub-section (i) dated the 26th March, 1988 inviting objections and suggestions from all the persons likely to be affected thereby, before the expiry of the period of fortyfive days from the date on which copies of the Gazette, containing the said notification are made available to the public;

And whereas the objections/suggestions received in respect public on 19.4.88;

And whereas the objections/suggestions received in respect of the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 3 of the said Act, the Central Government hereby makes the following rules further to amend the Ginger Grading and Marking Rules 1964, namely:-

#### RULES

1. (i) These rules may be called the Ginger Grading and Marking (Amendment) Rules, 1988.

(ii) They shall come into force on the date of their publication in the Official Gazette.

2. In the Ginger Grading and Marking Rules, 1964, -

(a) in rule 2, clause (2) shall be re-numbered as clause (6) thereof and before the clause (6) so renumbered, the following clauses shall be inserted, namely:-

(2) "Authorised Packer" means a person or a body of persons who has been granted a certificate of authorisation to grade and mark the commodity in accordance with the standards and procedure prescribed under these rules;

(3) "Certificate of Authorisation" means a certificate issued under the General Grading and Marking Rules, 1937, authorising a person or a body of persons to grade and mark the commodity with the grade designation mark;

(4) "Joint Agricultural Marketing Adviser" means Joint Agricultural Marketing Adviser (Quality Control) of the Directorate of Marketing and Inspection;

(5) "Regional Officer" means the Officer Incharge of the region of the Directorate of Marketing and Inspection"

(b) for rules 5, 6 and 7, the following rules shall be substituted, namely:-

5. "Grade designation mark" The grade designation mark shall consist of :-

- (i) a label specifying name of the commodity, trade description, grade designation, and bearing a design consisting of a outline map of India with the word "AGMARK" and figure of the rising sun with the words "Produce of India" and "भारतीय उत्पाद" resembling the one as set out in Schedule 1-A;
- (ii) "Agmark Replica" consisting of a design incorporating number of the certificate of authorisation, the word 'AGMARK name of commodity, grade designation and resembling the one as set out in Schedule 1-B.

Provided that the use of "Agmark Replica" in lieu

of Agmark labels will be allowed only by such authorised packers who have been granted permission by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser in this regard and subject to the conditions as may be stipulated from time to time.

6. Method of marking - (1) The grade designation mark shall be securely affixed to or printed on each container in a manner approved by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser.

(2) In addition to the grade designation mark the following particulars shall be clearly and indelibly marked on each container:-

- (i) Date of packing



- (ii) Place of packing
- (iii) Date of expiry (if applicable)
- (iv) Net weight
- (v) Lot number;

(3) An authorised packer may, after obtaining prior approval of the Joint Agricultural Marketing Adviser or the Regional Officer, mark his private trade marks on the containers in a manner approved by the said officer, provided that the private trade marks do not represent quality or grade of Ginger different from that indicated by the grade designation mark affixed to the container in accordance with these rules.

7. Method of packing - (1) The graded material shall be packed in clean, sound and dry containers such as jute bags, cloth bags, polywoven bags, paper bags, polythene, polypropylene or cellphane packs, metallised polyester or polythene laminated pouches, cardboard cartons, tin, glass or plastic containers, wooden cases or any other material as may be required by the buyer and/or approved by the Agricultural Marketing Adviser or Joint Agricultural Marketing Adviser.

(2) Suitable polythene or waterproof lining shall be used in packing or powdered material in jute bags, cloth bags or cardboard cartons etc.

(3) The containers shall be free from insect infestation, fungus contamination or any undesirable smell.

(4) Each package shall contain material of one grade designation only. Suitable number of small packs containing graded material of the same lot and grade designation may be packed in a large master container;

Provided that composite packing of consumers packs of different articles with varying grade designation in a single master container may be allowed against specific requirement of the foreign buyer and subject to the condition that each consumer pack shall carry appropriate grade designation mark and the details thereof shall be indicated on the tie-on label affixed to the master container.

(5) Each container shall be securely closed and sealed in a manner approved by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser in this regard;

(c) Schedule-I shall be renumbered as Schedule-1A and after the Schedule 1-A, as so renumbered, following Schedule shall be inserted, namely :-

"SCHEDULE 1-B

(See rule 5(11))

Design of "Agmark Replica"

(d) in Schedule III, V, VII and IX, for foot-notes 3 and 4, the following foot-note shall be substituted, namely:-

3. "Non-specified" is not a regular grade. It is provided to meet such specific requirements of the buyers which are not covered under the regular grades. It shall be allowed for export grading only against a specific order from the buyer indicating the quantity and quality required'

(c) for schedule X, the following Schedule shall be substituted namely:-

SCHEDULE-X

(See Rules 3 & 4)

Grade designation and definition of quality of ginger powder.

Grade Designation	Special Characteristics		
	Moisture percent by weight maxi- mum @	Total ash percent by weight max- imum	Ash insoluble in dilute HCL percent by weight maximum @
1	2	3	4
Standard	12.0	8.0	1.0

Contd....



Calcium as Cao percent by weig- ht maxi- mum.	Water solu- ash percent by weight maximum	Cold water soluble ex- tract per- cent by weight min- imum	Alcohol soluble extract percent by wei- ght min- imum	Volatile oil per- cent (V/W) minimum	General cha- racteristics
5	6	7	8	9	10
2.0	1.7	10.0	4.5	1.0	The Ginger powder shall

(a) be the material obtained by grinding clean, sound, mature and dried rhizomes of *Zingiber officinale*; Ros.

(b) be free from added colouring matter or any foreign matter.

(c) be free from mould growth, insect infestation or musty odour.

Non-specified\*

#### Explanations:

"Non-specified" is not a regular grade. It is provided to meet such specific requirements of the buyers which are not covered under the regular grades. It is allowed for export grading only against specific order from the buyer indicating the quantity and quality required.

@Moisture: A further tolerance of one percent will be allowed in respect of moisture during the monsoon period, i.e. from 15th May to 30th September.

## NOTES:-

(1) Principal rules published in the Gazette of India. Part-II, Section-3, Sub-Section (ii), dated 28th March 1964 as S.O. 1047 on pages 1267 to 1277.

(2) First amendment published in the Gazette of India, Part-II Section-3, Sub-Section (ii), dated 19th December 1964, as S.O. 4260 on page 4741.

(3) Second amendment published in the Gazette of India, Part-II, Section-3, Sub-Section (ii), dated 27th November, 1965, as S.O. 3631 on page 3822.

(4) Third amendment published in the Gazette of India, Part-II, Section-3, Sub-Section (ii), dated 18th November, 1967 as S.O. No. 4084 on pages 4322 to 4324.

(5) Fourth amendment published in the Gazette of India, Part II, Section 3, Sub-Section (i), dated 13th December, 1980 as G.S.R. 1278 on page 2527.

(The Gazette of India Part II - Section 3 - Sub-section(i)  
No.1, 1989, 43-44)

## 172 Prevention of Food Adulteration (Fifth Amendment) Rules 1988

G.S.R. 618 (E):- Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (137 of 1954), with the notification of the Government of India in the Ministry of Health and Family Welfare (Department of Health) G.S.R. 683 (E). dated the 31st July, 1987 in the Gazette of India Extraordinary, Part II, Section 3, Sub-section (i) dated the 31st July, 1987, at pages 1 to 6, inviting objections and suggestions from all persons, likely to be affected thereby before the expiry of sixty days from the date on which copies of the Gazette in which the said notification was published, were made available to the public;



And, whereas, the copies of the said Gazette were made available to the public on 31st July, 1987;

And, whereas, the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of Section 23 of the said Act, the Central Government after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules 1955, namely:-

#### RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Fifth Amendment) Rules, 1988.

(2) They shall come into force after a period of six months from the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the said rules), in Rule 4;

(i) for sub-rule (1), the following shall be substituted:-

"(1)(a) Samples of food for analysis under sub-section (2) of section 13 of the Act shall be sent either through a Messenger or by registered post in a sealed packet, enclosed together with a memorandum in Form I in an outer cover addressed to the Director.

(b) Samples of food for analysis under sub-section (2) of section 6 of the Act or under clause (a) of Rule 3 shall be sent either through a Messenger or by registered post in a sealed packet enclosed together with a memorandum in Form IA in an outer cover addressed to the Director";

(ii) for sub-rule (4), the following shall be substituted namely:-

"(4) On receipt of a package containing a sample for analysis, the Director or an officer authorised by him, shall compare the seals on the container and the outer cover with specimen impression received separately and shall note the condition of the seals thereon".

3. In rule 15 of the said rules, the following shall be omitted:-

(c) Name of the vendor "

4. In Appendix A to the said rules;

(i) After Form I, the following shall be inserted, namely:-

FORM IA  
(See Rule 4(1))

From: \_\_\_\_\_

-----

To

The Director,  
Central Food Laboratory,

-----

No.----- Dated the-----

MEMORANDUM

1. I send herewith under the provision of section 6(2) of Prevention of Food Adulteration Act, 1954, or clause (a) of Rule 3 of Prevention of Food Adulteration Rules, 1955 Sample(s) of a food purporting to be .....for test or analysis and request that a report on the result of test or analysis may be supplied to the undersigned:

(1) Distinguishing No. on the container and outer covering

(2) Matter on which opinion required.

2. A fees of Rs. 40/- has been deposited in the Treasury



creditable under the "8658-Suspense-P.A.O. Suspense Transaction adjustable by Pay and Accounts Officer, Dte. General of Health Services, Ministry of Health and Family Welfare, New Delhi, and final adjustment under "Receipt Head-0210-Medical and Public Health-04-Public Health fees and fines" in his books" and treasury challan for the same is enclosed.

3. A copy of memorandum and the specimen impression of the seal used to seal the container and the cover are sent separately by Registered post

Customs Collector/Authorised Officer  
(Seal)"

(2) In Form IV, after the words "Details of Food" the following shall be inserted, namely:-

"Code Number and Serial Number of Local (Health) Authority".

(3) For Form VIA, the following shall be substituted, namely:-

#### FORM VI-A

(See Rule 12-A)

#### Form of Warranty

Invoice No.

Place

From :

Dated

To :

Date of sale	Name & quality of article/ Brand Name, if any	Batch No. or Code No.	Quantity	Price
-----				

I/We hereby certify that food/foods mentioned in this invoice is/are warranted to be of the nature and quality which it/these purports/purport to be

(Signature of Manufacturer/Distributors/  
Dealer )

Name and Address of  
Manufacturer/Packer  
(in case of packed article)

License No.....  
(Wherever applicable)"

(4) In Form VII, the following shall be deleted.

"2, Name of the Vendor".

(The Gazette of India No. 270, Part II Section 3-Sub-section (i)  
1988, 4-5)

#### QUALITY CONTROL

#### 173 Aspartame in USA approved

At present there are 1,241 products in the world (5000 in USA) with aspartame as the sweetening agent. Aspartame is marketed under the trade name NutraSweet (for aspartame manufactured by NutraSweet Co, Deerfield, Ill.). Last June, the FDA in USA approved the use of aspartame for use in food products in six more categories: The six categories are:

a) Ready-to-serve, non refrigerated pasteurized, aseptically packaged fruit juice, beverages. For products with pH above 4.5, aspartame may only be added subsequent to pasteurization.



- b) Frozen desserts, both dairy and non dairy.
- c) Refrigerated flavoured milk beverages.
- d) Refrigerated ready-to-serve gelatin desserts.
- e) Fruit (including grape) wine, beverages containing less than 7% alcohol.
- f) Yogurt-type products where aspartame is added after pasteurization and culturing.

Consumer products in the newly approved above categories will be on the market by early 1989.  
(*Chemical Weekly* 34(27), 1989, 81)

## HYGIENE

### 174 High fat, calorie diet and colon cancer

A new study at the State University of New York (Buffalo), claims to be the first data to directly link the total amount of calories consumed and the risk of colon cancer. The researchers conducted detailed dietary interviews with 428 patients diagnosed with colon cancer and matched controls between 1975 and 1984.

An increased risk of colon cancer corresponded to increases in the amount of both total fat and total calories. In those who consumed the most fat and/or calories, risk of colon cancer was 4-times higher in men and 2.5 times higher in women, compared with their low fat and/or low-calorie diet cohorts.

Consumption of dietary fibre appeared to reduce the risk of colon cancer for women only, with the most significant reduction from high intake of tomatoes, peppers, carrots, onions and celery.

(*Chemical Weekly* 34(35), 1989, 83)

## 175 The catch in cholesterol-free milk

Researchers in the US claim to have perfected a technique that removes 90 per cent of the cholesterol from milk.

As per Syed Rizvi a process carbon dioxide is forced through the milk at very high pressures and temperatures (about 2750 kilopascals and 40 C), so that the cholesterol dissolves into the carbon dioxide. At these temperatures and pressures, the carbon dioxide passes through a physical phase between its gas and liquid state and becomes a "supercritical fluid". Cholesterol is highly soluble in carbon dioxide in this supercritical form.

Other teams have tried to extract cholesterol from milk in the same way, but Rizvi says that they have not been as successful.

Once the carbon dioxide has picked up the cholesterol, along with a small amount of the triglycerides, the supercritical carbon dioxide passes to a second chamber. Here, the temperature and pressure altered and the carbon dioxide gives up its cholesterol. The carbon dioxide then flows into a third vessel where the pressure is reduced, the carbon dioxide becomes a gas dissipates and leaves behind the triglycerides that it has carried from the milk.

The researchers collect the fats from the first and third vessels which they can add to skimmed milk to produce cholesterol-free milk with, say, 2 per cent fat content - the equivalent of semi-skimmed milk. Whole milk contains about 3.3 per cent fat and 0.014 per cent cholesterol. Skimmed milk contains roughly 0.1 per cent fat and 0.002 per cent cholesterol.

Rizvi says that, although he has concentrated on taking the cholesterol out of the milk, his process could produce milk with a lower ratio of saturated to unsaturated fat than ordinary whole milk.

He would do this by taking advantage of the fact that less volatile saturated fats vaporise more slowly than unsaturated fats



Rizvi could add fractions of unsaturated fats to skimmed milk to produce milk with little cholesterol and a more healthy ratio of saturated to unsaturated fat.

(*New Scientist* 22 April 1989, 38)

## TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

### 176 Wimco to diversify food processing

Wimco is planning to diversify into farm-forestry and food processing in a big way, following the recent takeover of its parent company Swedish Match by another Swedish giant, Stora, the biggest forest industry enterprise in Europe.

The company is gearing up its Food Processing Division as it has identified huge local as well as export markets. A variety of fruit-based concentrates have also been developed. It has plans to make natural fruit drinks as well. In packaging it plans to make hi-tech packaging products with the help of the Swedish company.

(*Industrial Products Finder* 17(5), 1989, 115)

### 177 Dharnendra Group to set up icecream unit

Dharnendra Group of industries, engaged in the manufacture of readymade garments and furnishing for the past 20 years, is promoting Dharnendra Icecream Ltd. The modern plant with an annual capacity of 28 lakh litres of icecream is coming up at the GIDC Estate, Gandhinagar, at a cost of Rs. 1.75 crore. Sophisticated automatic plant and machineries are being imported from Denmark and Italy. The company is introducing computerised control system for the first time in the country to monitor product quality.

The plant is expected to start commercial production in March 1989. The company is likely to start a deep freezer project at a cost of Rs. 1.25 crore. The company has planned to establish 1,500 outlets including well designed icecream parlours during the first year of commercial production.

*(Industrial Products Finder 17(5), 1989, 87)*

#### 178 Beer production

Kishore Chhabria of Shaw Wallace seems hell-bent on making a big splash in the country's beer market. According to Calcutta-based sources, Shaw Wallace plans to set up as many as three new plants to make beer. One brewery will come up in Maharashtra, another in Himachal Pradesh and the third in West Bengal. Together, these units will add 600,000 litres of beer to Shaw Wallace's capacity which should see the company run headlong into confrontation with market leader UB. The investment outlay for these plants will be over Rs. 36 crore as they are likely to incorporate the latest technology in beer production.

*(The Economic Times 9 April 1989, 3)*

#### 179 Pineapple juice unit coming up in Assam

Modern Food Industries (India) Ltd is setting up a pineapple juice concentrate plant in Silchar, Assam. This is scheduled to be completed by 1989-90. The company is planning additional breadline and the facility in the Delhi bakery unit was commissioned in November 1988. The expansion of the fruit juice bottling plant in Delhi was also completed and the expanded capacity was inaugurated in 1988.

*(Industrial Products Finder 17(6), 1989, 113)*



## 180 New drink from NERAMAC

North Eastern Regional Agricultural Marketing Corporation Ltd., (NERAMAC), has launched a pineapple fruit drink, 'PINEAP' in tetra brik aseptic consumer packs.

NERAMAC, a government of India enterprise, comes under the administrative control of ministry of food processing industries. Its marketing operations are directed towards the upliftment of the fruit and vegetable growers of the north-eastern region, facing major problem of transport and marketing of their horticultural produce.

NERAMAC's Rs 4 crore fruit juice concentration plant is set up at Nalkata, Tripura. The first plant of its kind in the country, it is capable of processing 2,000 pineapples per hour. Equipped with the most modern machinery imported from Italy, Sweden and the USA, the plant can process fruit in the most hygienic way

*(Commerce 5-11 April 1989, 48)*

## 181 Vegetable oil refinery in Assam

Assam State Co-operative Marketing and Consumer Federation Ltd., (Statefed), the apex co-operative organisation in trade in the state is setting up a vegetable oil refinery here for refining the imported vegetable raw oil for the entire north eastern region

The capacity of the refinery will be 50 tonnes per day and the approved project cost is Rs. 2.68 crores to be funded by the National Co-operative Development Corporation (NCDC).

The Statefed is implementing a few Centrally-sponsored schemes like the expansion of the existing vanaspati plant from its present capacity of 62.5 tpd to 125 tpd at a cost of Rs. 13-24 crores (95 per cent of which will be loan from the World Bank through NCDC).

*(The Economic Times 26 April 1989, 10)*

## 182 Milkfed plans to set up UHF plant

The Punjab State Co-operative Milk Producers Ltd (Milkfed) has planned to set up a Rs. 3-crore ultra high fat (UHF) plant near Chandigarh this year to supply milk in tetra packs. In the initial stages, Milkfed is likely to launch tetra packs at Leh, Jammun and Kashmir and later in Karnataka. These packs will have a shelf-life of six months.

Milkfed has recently launched four of its milk products, Verka-skimmed milk powder, whole milk powder pure ghee and processed cheese, in Karnataka. Milkfed's turnover, which stands at Rs. 80 crore, is expected to cross Rs. 100 crore by 1988-89.

(*Industrial Products Finder* 17(6), 1989, 123)

## 183 First vanaspati unit in Manipur

Oswal Wollen Mills Groups has joined hands with the Manipur Government for setting up the State's first vanaspati unit in Imphal. Manipur Vanaspati and Allied Industries Ltd., the Rs. 12-crore project to produce 125 tonnes per day (TPD) is expected to begin production by mid-1989. While the Manipur State Industrial Development Corporation will contribute 26 per cent, the Oswals will contribute 25 per cent of the equity.

The group is also going ahead with its plans to set up a joint sector vanaspati unit in collaboration with the UP Government.

(*Chemical Products Finder* 7(10), 1989, 115)

## 184 Glindia, PICUP Joint Venture

Vegepro Foods and Feeds Ltd., a joint sector project promoted by Glindia Ltd. and the Pradeshia Industrial and Investment Corporation of UP Ltd. (PICUP), has set up a



project at Orai, Jalaun district, UP, for the manufacture of texturised vegetable proteins, edible soya flour, soya oil, soya meal to be followed by other sophisticated downstream products. The plant will have a capacity to process 90,000 tonnes per annum of soyabean.

The company has made arrangements for the latest flash desolventising technology for the manufacture of edible soya flour from EMI of the US. The refining plant is set up with Alfa Laval technology. The company will provide high quality low-cost edible soya proteins and refined/deodorized soya oil for manufacturing a wide variety of high protein products for special target groups. Edible soya flours will be used as additives to wheat, maize and other cereals to increase protein efficiency.

These texturised products can be used as vegetarian meat analogues and instant vegetarian meals based on texturised soya products.

*(Chemical Products Finder 7(10), 1989, 118)*

#### 185 Grape Processing Unit At Miraj

A Rs. 1.25-crore co-operative processing factory for converting grapes into raisins has been recently inaugurated in the premises of the Maharashtra Industrial Development Corporation at Miraj. The factory will process 20 tonnes of grapes per day.

*(Chemical Products Finder 7(10), 1989, 123)*

#### 186 Amrit Protein Foods plant opened

Amrit Protein Foods Ltd., a company promoted by Amrit Banaspati Company, was inaugurated by the Minister for Food Processing, Mr. Jagdish Tytler, on Thursday.

Set up at Ghaziabad with a total outlay of Rs. 15 crores, the unit will produce soya milk and soya milk beverages in various flavours.

*(Financial Express 19 May 1989, 6)*

SPECIAL ARTICLEDIETARY FIBRE IN INDIAN DIETS AND  
ITS NUTRITIONAL SIGNIFICANCE

B.S. Narasinga Rao

Dietary fibre is defined as plant cell components, present as part of diet, and resistant to digestive secretions of the gastrointestinal tract. Thus they are considered as "unavailable carbohydrates". Dietary fibre, however, is not a single entity, but consists of a wide range of complex polysaccharides. Dietary fibre in any food is a mixture of cellulose, lignin and non-cellulosic polysaccharides namely hemicellulose, plant gums, pectins, and mucin (Table 1). Dietary fibre is usually determined by fractionation procedures and the one proposed by Southgate is now widely used. The estimate of amount of dietary fibre in a food will depend upon the analytical method used for the estimation and the values so obtained need not necessarily be considered always precise. Dietary fibre estimation is still considered to be only quantitative.

"Crude fibre", which is reported in food composition tables now in general use, represents material left after treating food with hot acid and hot alkali and perhaps corresponds to a part of cellulose and lignin component of dietary fibre and does not include all other components of dietary fibre as defined earlier. The total dietary fibre content in foods as determined by modern methods is five to 20 times higher than the earlier reported values for the "crude fibre" content. Chemically dietary fibre is polysaccharide whose basic units are neutral sugars such as glucose, mannose, xylose, arabinose and their derivatives or galacturonic acid. Lignin is a complex material composed of phenolic derivatives (Table 1). Plant foods contain different proportions of these dietary fibre components which are now determined by the standard fractionation procedure proposed by Southgate. Limited data derived from analysis of Indian foods for dietary fibre employing Southgate's method have been reported (Table 2).



Dietary fibre component of common foods consumed in India vary from 2 to 25 g per 100 g. Cereals and pulses are rich sources of dietary fibre, and contain 8.20 g fibre per 100 g. Dietary fibre in composite diets is contributed by cereals, pulses, vegetables, fruits, nuts and oilseeds. In Indian diets, however, cereals and millets are more important sources of dietary fibre than vegetables and fruits, etc. Dietary fibre content of some diets, consumed in India based on different cereals is given in Table 3. Nearly 90 percent of dietary fibre in Indian diets is contributed by cereals, not only due to fairly high fibre content of unrefined cereals/millets, but also due to a high consumption of the unrefined cereals/millets in Indian diets. An Indian adult may thus consume 50-120 g dietary fibre/day through his habitual diet depending upon the type and the quantity of cereals/millets consumed (Tables 3 and 4). Diets of pre-school children may contain 20-25 g of dietary fibre/day (Table 5). The desirable level of daily dietary fibre intake by an adult is generally believed to be around 40 g. It would appear that on this basis, dietary fibre content of habitual Indian diets which ranges 55-120 g is on the higher side. Hence a reappraisal of the beneficial and undesirable effects of such high levels of dietary fibre in Indian diets become necessary.

TABLE 1  
Components of Dietary Fibre

Major class	Property	Chemical Steriods
Cellulose	Water insoluble	Linear 1-4-3-glycan
Non-cellulose polysaccharides		
Pectin	Water soluble	Galacturonic acid.
Hemicellulose	Water soluble	neutral sugars
Gums	Water soluble	Xylose, arabinose, galactose, mannose
Mucilages	Water soluble	Xylose, arabinose, rhamnose
Lignin	Water insoluble	Galactose, galalumeric acid, rhamnose
		Polymer of hydroxy phenyl propone derivatives

TABLE 2  
Dietary Fibre Content of Some Common Indian Foods

Food stuff	Energy <sup>a</sup> kcal	Crude <sup>a</sup> fibre gm	Dietary fibre <sup>b</sup> gm	Food stuff	Energy <sup>a</sup> kcal	Crude <sup>a</sup> fibre <sup>a</sup> gm	Dietary fibre <sup>b</sup> gm
Cereals & millets:							
Rice	345	0.2	7.6	Roots & tubers:			
Wheat	346	1.2	17.2	Sweet Potato	120	0.8	7.3
Sorghum	349	1.6	14.3	Potato	97	0.4	4.0
Bajra	361	1.2	20.3	Yam	79	0.8	5.3
Ragi	328	3.6	18.6	Fruits:			
Pulses & legumes:							
Gereengram whole	334	4.1	15.2	Banana	116	0.4	2.5
Greengram dhal	348	0.8	13.5	Mango	74	0.7	2.3
Blackgram dhal	347	0.9	14.3	Vegetables:			
Redgram dhal	335	1.5	14.1	Amaranth	45	1.0	3.4
Bengalgram whole	360	3.9	26.6	Palak	26	0.6	5.0
Bengalgram dhal	372	1.2	13.6	Brinjal	24	1.3	2.0
Nuts & oilseeds:							
Groundnut	567	3.1	6.1	Ridge gourd	17	0.5	5.7
Coconut dry	662	6.6	8.9	Snake gourd	18	0.8	1.8
				Bottle gourd	12	0.6	2.8
				Yellow Pumpkin	23	0.7	0.5

Values are for 100 g food  
a: taken from Nutritive Value of Indian Foods; b: from  
Kamath and Belvadi J.Sc.  
Food Agr. 31, 191 (1980)



TABLE 3  
Dietary Fibre Content of Average Rural Indian Diet Based on  
Different Cereals

Cereal/Millet	Energy (kcal/d)	Crude fibre (g/d)	Dietary fibre (g/d)	Overestimation of <sup>a</sup> energy intake (%)
Rice	2427	3.3	52.0	8.0
Wheat	2433	8.8	107.0	16.2
Sorghum	2449	11.0	89.2	12.8
Bajra	2516	8.8	122.3	18.0
Ragi	2333	22.0	113.5	15.7

Daily intake of cereal: 552 g

a: By considering dietary fibre as a part of carbohydrate and computed as follows:

$$\text{Dietary fibre} = \frac{\text{crude fibre} \times 4 \times 100}{\text{Energy intake}}$$

### Beneficial Effects of Dietary Fibre

Health benefits of dietary fibre are being increasingly recognised. Some of the diseases like colon cancer, cardiovascular diseases prevalent in developed countries are attributed to low fibre content of their diets. Dietary fibre has the tendency to absorb water and to act as "bulking agent". It facilitates faster transit of foods in the gastrointestinal tract and reduces the retention time of faeces in the colon. Some of the well established functions of fibre are indicated in Table 6. Dietary fibre could prevent colon cancer and other bowel disorders by decreasing retention time of faeces in the colon. It could bind bile salts and help in increasing the loss of cholesterol and act as a hypocholesterolemic agent and therefore useful in dietary management of cardiovascular diseases. Similarly, some of the dietary components, particularly gums, tend to slow down glucose absorption and are useful in management of

certain types of diabetes. Dietary fibre may bind xenobiotics and toxins and reduce toxicity of food borne toxins. Because of these favourable functions of fibre in the diet, high fibre diet is considered to be beneficial for maintaining good health. Some of the cereal based Indian diets contain 80-120 g dietary fibre, mostly (90 percent) derived from cereals. The relative effectiveness of such high fibre diets (wherein fibre is mostly derived from cereals) in conferring the above health benefits on Indians in comparison with diets with high fibre content wherein fibre is derived from fruits and vegetables, needs assessment.

TABLE 4  
Dietary Fibre Content of Regional Diets

Regional diets	Energy (kcal/d)	Crude fibre (g/d)	Dietary fibre (g/d)	Overestimation of energy intake (%)
Andhra Pradesh				
Very low income	2558	4.4	57.7	8.3
Low income	2592	4.7	53.0	7.5
West Bengal:				
Very low income	2621	4.5	56.4	7.9
Low income	2649	4.3	56.9	7.9
Uttar Pradesh:				
Very low income	2650	7.2	48.0	6.2
Low income	2619	6.6	67.4	9.3
Maharashtra:				
Very low income	2595	9.1	81.6	11.2
Low income	2554	7.5	68.6	9.5

a: By considering dietary fibre as a part of carbohydrate by difference and computed as given in Table 3.

b: Actually determined in cooked diet (Nageswara Rao and Narasinga Rao, Nutr. Met. 24, 244, 1980)



TABLE 5

Dietary Fibre Content of Diets of Pre-School Children of  
Different Income Groups

Socio-economic Group	Energy (kcal/d) (g/d)	Crude fibre (g/d)	Dietary fibre
<u>Rice</u>			
High income	1011	0.9	12.0
Middle income	792	1.0	13.0
Low income	701	0.9	12.7
Rural income	610	0.8	12.2
<u>Wheat</u>			
High income	1012	1.9	21.6
Middle income	793	2.1	23.6
Low income	703	2.3	26.0
Rural income	612	2.1	24.5
<u>Sorghum</u>			
High income	1015	2.3	18.7
Middle income	776	3.2	20.4
Low income	707	2.8	22.0
Rural income	615	2.6	20.8
<u>Ragi</u>			
High income	994	4.3	23.0
Middle income	774	5.4	25.1
Low income	678	5.6	28.0
Rural income	589	5.1	26.3

### Possible Undesirable Effects

Nutrient bioavailability: Notwithstanding the health benefits of dietary fibre discussed above, fears have been expressed that high fibre diet may reduce nutrient bioavailability. This may become critical in diets high in fibre, but poor in nutrients. Diets of poor Indians in rural areas are rather high in fibre (80-120 g/day) but marginal or even deficient in several nutrients. Although the effects of dietary fibre on various nutrients like "available" carbohydrates, fats, proteins and minerals have been

studied, evidence of significant deleterious effect has been seen only in case of divalent metals like Ca, Mg, Zn and iron.

The reported effects of dietary fibre on the bioavailability of proteins and fats are too small to be nutritionally significant. However, in case of carbohydrates, although the net availability is not affected, dietary fibre particularly the soluble gel forms (pectins and gums) have been shown to modulate absorption of available dietary carbohydrates. Although the mechanism of this effect is unclear at present, various mechanisms like increased viscosity, delayed stomach emptying time and osmotic effect of diets containing soluble fibre have been proposed. The effect of dietary fibre in delaying carbohydrate absorption is currently exploited in the dietary management of diabetes for preventing excessive rise in blood glucose.

TABLE 6

Some Properties of Dietary Fibre and Their Health Consequences

Function	Health Consequences
Water absorbing and bulking property	Energy diluent to formulate low calorie diets
Increased transit time of food in the gut	Reduced risk of inflammatory bowel disease
Bile acid and steroid binding	Hypocholesterolemic agent and reducing the risk of cardiovascular diseases
Retardation of carbohydrate absorption and impaired glucose tolerance	Management of certain type of diabetes
Binding of toxins	As a detoxifying agent
Binding of divalent cations	Reduced bioavailability of Ca, Mg, Zn, Fe.



The effect of fibre on divalent metal absorption is considered nutritionally significant. These polysaccharides with reactive groups like hydroxyl and carboxyl can bind divalent cations. Besides, phytates, oxalates, tannins which are closely associated with the fibre can also bind minerals and reduce their bioavailability. This effect on mineral bioavailability assumes importance in high fibre diets consumed in India. The effect on mineral bioavailability depends on the fibre type and the minerals; all fibre types may not affect all minerals to the same extent. Minerals, so affected are Ca, Zn, Fe, Mg. Reduced bioavailability of minerals particularly iron observed in cereal-based Indian diets may be partly due to high fibre and partly due to high phytate and tannins present in such diets. The relative contribution of fibre, phytate and tannins in reducing bioavailability of minerals from cereals based Indian diets needs to be assessed. As far as vitamins are concerned, nothing can be predicted about the behaviour of fibre on vitamin bioavailability from the currently available data. However, as with other macro-nutrients, available information indicates that the effect of fibre, on vitamin availability, if any, need not cause any concern. On the other hand, fibre due to its undergoing colonic microbial fermentation may contribute some vitamins to the host. There is, however, a need to study systematically to what extent high fibre present in Indian diets contributes to low absorption of iron, calcium, etc. with well-designed studies in humans. It is also to be seen whether dietary fibre at the level present does modify vitamin availability and significantly affect already existing deficiencies of vitamins among our population.

Energy availability from high fibre diets: There has been some concern that high levels of dietary fibre may compromise bioavailability of energy from such diets. This concern stems from the consideration that dietary fibre, by definition, is "indigestible" and hence its energy content may not be utilisable by the body. Current estimates of energy content of foods assumes

that only the "crude fibre" is indigestible and, in the present conventional methods of food analysis, the rest of the fibre is included as a part of dietary carbohydrate which is computed by difference, i.e. by deducting the protein, fat, moisture, crude fibre and ash content per 100 g from 100. By this procedure, dietary fibre excluding the crude fibre is assumed to yield 4 kcal/g. We know now that dietary fibre content of food is several-fold higher than "crude fibre" and the energy from the rest of the dietary fibre apart from crude fibre may not be fully available. Thus current estimates of energy content of foods and diets could be overestimates and there is, therefore, a need to reevaluate the energy content of foods after taking into account their total (and not just "crude fibre") dietary fibre content.

High fibre diet can compromise availability of energy from diets in two ways: dietary fibre has the property of swelling on water absorption and increasing the bulk of the diet and decreasing its energy density.

With a given capacity of stomach, the amount of food that can be eaten, and the energy intake therefrom will be correspondingly low on a bulky high fibre low-calorie-density diet. This is particularly so with young children who need relatively more calories per kg body wt (100 kcal/kg) than adults (40 kcal/kg). Young children will have to eat two or three times as much of the bulky diet as an adult per kg body weight to meet their calorie needs. The principle of diluting energy density of diet with inclusion of fibre is in fact used to formulate low calorie diets for the control of obesity.

Another way calorie intake on a high fibre diet may be low is due to unavailability of energy from dietary fibre. This may be significant if dietary fibre content in the range of 80-120 g/day as in habitual Indian diets, based on different cereals and millets. As discussed above, most of the dietary fibre is taken as available carbohydrate in computing energy content of foods given in our food composition table. On this basis, current computation of energy



intake on high fibre diet would be an overestimate. Dietary fibre however, by definition is unavailable carbohydrate not subject to enzyme hydrolysis and absorption in the small intestine. Then we would have overestimated energy intake on cereal based diets by eight and 12 percent (i.e. 200-300 kcal/day/adult), If it were really so, it would have far reaching consequences on present estimates of energy adequacy in our population and also other derived parameters based on energy intakes, namely proportion of population below poverty line, etc. Let us examine this issue in the light of available data.

### Microbial Breakdown of Dietary Fibre

Although dietary fibre is conceptually indigestible and unavailable, its possible breakdown by gastrointestinal microflora has been investigated for more than half a century. It is widely known that plant cell-wall materials which constitute dietary fibre are broken down by symbiotic microorganisms in rumen from which they derive their energy. There is also considerable evidence to indicate that such complex carbohydrates, as cellulose, hemicellulose and non-cellulosic polysaccharides are broken down by microorganisms of the intestinal flora, particularly in the colon of non-ruminants like rat, rabbit and man. This is based on several studies including in vitro studies, balance studies, where faecal loss of calories and fibre components are measured in faeces of rat, man, rabbit, etc. Balance studies with rice and sorghum-based diets in rats by Kamath and Belavadi has indicated that only 20 and 37 percent of fibre from these two diets are excreted in faeces respectively. It is seen that 70-80 percent of the fibre is broken down. It is known that a substantial part of dietary fibre is broken down by the microflora of the lower gut releasing lower fatty acids like acetic propionic, butyric acids,  $\text{CO}_2$ , hydrogen and methane. These fatty acids can be absorbed and utilised as energy sources. The latter has also been demonstrated by feeding fibre to rats on energy restricted diets. Bacteria recovered from colon, faeces of both men and animals has been shown to possess hydrolysing

activity against a variety of polysaccharides. The dietary fibre components thus broken down include pectins, cellulose, hemicellulose, some gums, non-cellulosic glucans, mucopolysaccharides and mucin glycoproteins.

The extent of digestibility of dietary fibre would vary from one fibre component to the other and would also depend on the profile of the gut microflora in the individual. The extent of the digestibility of dietary fibre also would vary from one food source to the other, apparently because of the chemical composition of the fibre type. Fibre from vegetables and fruits are reported to be digestible to the extent of 50 to 80 percent. From all available information it would appear that at least 50 percent of the dietary fibre present in diets may be broken down by colonic microorganisms releasing acetic, propionic and butyric acids which can be absorbed and used as sources of energy. In the light of available data, it would be rather inadvisable to conclude that the whole of dietary fibre in Indian diets is unavailable. There is an urgent need to study systematically the colonic breakdown of dietary fibre present in Indian diets which are derived mostly (90 percent) from cereals and millets. Such studies must be carried out not only in animals, but in subjects habituated to these diets since it is reported that individuals accustomed to eating high fibre diets are more efficient in breaking down and utilising these fibre components than those who are not used to such diets. For the time being the question may be kept open and for practical purposes, about 50 percent of these fibres may be assumed to be available for providing energy. If this were so the actual overestimation in present computations of energy intake by our population will be in the range of only four to six i.e. 120-150 kcal/day/C.U.

There is a clear need for a reappraisal of energy intakes of our population subsisting on high fibre cereal/millet diets based on accurate information on the availability of energy from the dietary fibre present in these diets.

*(Reprinted from NFI Bulletin, October 1988)*



# SUBJECT INDEX

- Additives, natural, for food preservation 102
- Amino acid from human hair 118
- Aspartame use in food allowed in USA 173
- Assam, vegetable oil refinery 181
  
- Bamboo bin, hollow, for paddy storage 103
- Beer production, Shaw Wallace 178
- Betal leaves export 151
- Bin, bamboo, for paddy storage 103
- Biscuit, consignment tax 161
- Bitter taste, new observation 144
- Bread using roots and tubers 114
- Brewing industry, filtration 140
- Broad-banding, processed foods 159
- Bureau of Indian Standards Office establishment 156
  
- Calorie-fat diet, colon cancer 174
- Cancer (colon), high fat, calorie diet 174
- Cashew kernel export 147
- Centrifugal pump 137
- Cereal storage, application of refrigeration 104
- Cess on spices, rules, 170
- Chapati/papad making machine 132
- Child labour (Prohibition and Regulation) rules 169
- Chillies export 148-9
- Cholesterol free meat, production process 166
- Cholesterol free milk 175
- Cholesterol reduction, milk 115
- Coconut oil extraction process 111
  
- Coconut oil for surfactant 113
- Co-extrusion plant 125
- Cold storage of potatoes 105
- Cooking system, induction type 141
- Corn-oil, protein rich, development 112
  
- Dairy development technology mission 164
- Dairy products quality improvement 109
- Dehumidifier/seed dryer 122
- Deoiled meals, export potential to far East 153
- Dharnendra group, ice cream unit 177
- Dryer
  - grain 119
  - root crops, agro-waste as fuel 120
  - rotary cone type 123
  - seeds/dehumidifier 122
  
- Electric device to scare rodents 107
- Export
  - betal leaves 151
  - cashew kernel 147
  - chillies 148-9
  - HPS groundnut 152
  - marine goods 150
- Export potential, deoiled meals to Far East 153
- Exporters grievances cell 155
- Exporters, spices, registration with Spices Board 154
- Extruder for food 124
- Extrusion see also co-extrusion
  
- Fat, calorie diet, colon cancer 174
- Fermentor, lab model, automated 133
- Filling machine
  - for liquids 127
  - for powders 128

**RAW MATERIALS****187 Edible oil from flax seed**

Biotechnica (Canada) and Australian CSIRO are collaborating to develop a new edible vegetable oil from flax seed. Under a proposed joint venture the researchers from the above two countries will develop varieties of flax which produce oil similar to sunflower or corn oil.

By the mid 1990s edible oil flax may be grown on several million acres as an alternative crop.

(Chemical Weekly 34(40), 1989, 82)

**188 Organic vegetables**

An astounding 84% of American consumers would buy organically-grown food if it cost the same as that produced with synthetic fertilizers and pesticides, and 49% would buy it even if it cost more.

Organic food isn't just for alternative lifestyle hippies and little old ladies in tennis shoes any more. It isn't even grown just at ramshackle communes, but on large farms where (for example) huge vacuum-cleaners suck up insects as an alternative to spraying them.

Sunkist Growers and Dole Foods are among the major players to have gotten into organic farming in the last few years. Sales of organic products doubled from \$ 500 million to \$ 1 billion between 1983 and 1988, estimates California Certified Organic Farmers, a trade group. A Maryland firm, Organic Farms, Inc., was the country's top distributor of organic products last year, with sales of \$ 22 million.

Organic produce usually costs 15-30% more than traditionally grown product, but some attribute this to start-up and distribution costs that could be considerably reduced by economies of scale. Less than one percent of all produce is now grown organically, but that could increase to eight or nine percent in the next few years because of increased consumer demand. Some 20 major supermarket chains began stocking organic products in the last six months, according to Organic Farms, and that was before the March scares about alar on apples and cyanide in Chilean grapes.

(Quick Frozen Foods International 30(4), 1989, 36)



**STORAGE****189 Fruit stays fresh longer**

Fruit and vegetables can stay fresh longer in a range of bags made from natural stone powder compounded with low density pe film, claims Takii Shubyo Co. Ltd.

Marketed under the name TS-film Nagomochikun - Mr Longer Lasting - the bags absorb ethylene gases generated by vegetable matter which accelerates the deterioration process, says the company.

For details write to: Inokuma Higashihairu, Umekoji, Simogyo-ku, Kyoto.  
(Packaging News May 1989, 30)

**190 Tomato treatment for better storage**

Biologists at New York's Cornell University have developed a natural, inexpensive treatment which will keep ripe, tasty tomatoes on the supermarket shelf twice as long as present varieties. The treatment uses biochemical clues from an obscure Brazilian tomato called Alcobaca. If the treatment is used commercially, supermarkets may be able to stock ripe tomatoes for 10 to 12 days. Today, unsold tomatoes are thrown away after 4 to 5 days.

To slow the ripening process of the fruit, the American researchers use polyamines, which are a natural part of a tomato's chemical make up. They add 1 milligram of the polyamine 1,4 butanediamine to a tomato that has been picked after it begins to ripen on the vine.

Peter Davies, professor of plant physiology, and his colleagues realised the importance of 1,4 butanediamine because they found that the Alcobaca tomato had nearly three times as much of the chemical as standard tomatoes. The tomato is also unusual in that it stays ripe and firm longer than any other tomato.

The scientists infuse tomatoes of the Rutgers variety with the polyamine using a method called vacuum infiltration. This involves forcing the air out of the fruit while it is in an airtight container with the polyamine in solution. When the vacuum is released, the polyamine is drawn into the tomato through the stem or stem scar.

The Alcobaca tomato has yet another characteristic which makes it exceptional. It has to ripen fully on the vine because it will not ripen if it is picked green. This is important because tomatoes taste best when they are allowed to ripen on the vine. However, most tomatoes in the supermarket have to be picked while still green because ripe tomatoes are perishable.





The films could also be used to modify produce and, according to Pavleth, add "exciting new flavours or colourings to standard fare".

One possibility, he suggests, is to "jazz up" sliced pears by protecting them with a protein coating flavoured with natural red cherries. The coatings could also be used to keep fillings in pies and pizzas from soaking the crust, says Pavlath.

Although the barrier keeps cut fruit and vegetables fresh for several days, food companies are unlikely to use Pavlath's coating unless it can preserve food for several weeks, because of the amount of time it takes to distribute food to supermarkets.

Pavlath believes that he will be able to make his coating more effective by making the molecular mesh even finer. The problem, however, is not trivial, because if the mesh is too fine then the film will become rigid and prone to crack, allowing the food to decay.

Pavlath is trying to find a solution by adding various compounds to his milk coating, although, because the coating has to be edible, his choice is restricted.

"Trying to overcome the technical problems and satisfying the FDA is like dancing on a tightrope," says Pavlath. "I am sure it can be done, but it is a matter of time, perhaps two years". Ballab Ghosh.

(New Scientist No. 1669, 17 June 1989, 44)

## 193 Pumps to deliver pesticides

A simple fumigation technique could rid grain silos of insects much more effectively than conventional methods. Entomologists unveiled the technique, called Siroflo, at Moree in New South Wales, Australia, this week.

Siroflo, which was developed by researchers at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) involves pumping low concentrations of phosphine gas mixed with either nitrogen or carbon dioxide through the grain at a constant rate.

The technique promises to be a boon to farmers all over the world because insects in many countries are proving resistant to phosphine as the pesticide is currently applied. Bangladesh, Pakistan and India, in particular, have been reporting that insects are becoming resistant to phosphine.

This method normally eliminates the pests in two stages of their development, the larval and adult stages, but not when they are eggs and pupae. The surviving eggs and pupae are difficult to detect. Unless high concentrations of phosphine are used for long periods, the insects could breed again.

(New Scientist No. 1670, 24 June 1989, 38)

## 194 Food-biocide for increased shelf-life

Raw fruits, vegetables, fish, sea-foods, meat, poultry, etc are mostly contaminated with pathogenic micro-organisms which not only make them unhygienic for human consumption, but also limits their shelf-life because they become unpalatable and foul smelling after certain time on storage, due to the deterioration in their natural taste and flavour.

An extremely powerful Biocide, AQUARINE liquid, destroy these micro-organisms, including bacteria, viruses, moulds, fungus, algae, yeast, etc effectively and economically. Aquarine also reacts with the putrid organic waste matters and destroy the foul odours. It controls the growth of micro-organisms, which promotes fermentation and purification. Moreover, it also destroys the unwanted Blood-Urea from the sea-foods. The raw foods, when properly treated by Aquarine, therefore, remain in fresh and palatable for much longer period and have thus, longer shelf-life.

Aquarine is equally useful as effective disinfectant for sterilizing and deodorizing the plant, equipments, containers, drainage, floor, water, etc; in the frozen foods, fisheries, canning, dairy, flour and rice mills and soft drinks industries. It is also useful for keeping the housefly away.

For further information please contact: Surfochem Industries, 3, Nilkanth Sadan, Peru bah, Aarey Road, Bombay - 400 063.

## FOOD ADDITIVES

## 195 Sucanat - A new natural sugar from Swiss research

Sucanat is a sweet alternative to refined white sugar recently marketed by Pronatec Ltd. (Switzerland). It was developed by Dr. Max Henri Reguin. It is a natural product, since it is fully dehydrated, evaporated cane juice. Sucanat contains all the vitamins and trace minerals lost during refining of sugar cane.

Sucanat is made by pressing the cane, filtering the juice to remove cellulose fibres, concentrating the juice, then drying in a vacuum and granulating. The result is a final product, which is a 1:1 replacer for sugar with 2.5% mineral salts, vitamins and minerals such as potassium, calcium, iron, phosphate, magnesium, zinc, copper and chromium.

This natural sweetener is not a low calorie product. It has slightly fewer calories than the equivalent of white refined sugar. Over 60 food companies have shown active interest in this natural sugar.

(Chemical Weekly 34(40), 1989, 81)



## 196 Food dyes corrode copper

Recent findings by Indian scientists indicate that aqueous solutions of food dyes can cause corrosion of copper - a fact which must be borne in mind while preparing artificial food colours.

The amount of copper in food articles ranges from 20 parts per million (ppm) in beverages to 100 ppm in tomato juice. Although copper is considered to be quite resistant to attack by most food items, it may corrode in the presence of oxygen or an oxidising agent. In such cases, the product may pick up enough copper to affect the colour or taste and give rise to off-flavours.

The corrosion of electrolytic copper by various food dyes like ponceau 4R, tartrazine, amaranth, carmoisine, sunset yellow, fast red E, indigo carmine and erythrosine was studied. The effects of additives like mango essence and sorbitol, or preservatives like sodium benzoate and potassium metabisulphate, on copper corrosion was also studied.

Very dilute (less than or equal to 0.01 per cent) solutions of the colourants were only mildly corrosive. However, a definite change in colour was observed in solutions containing ponceau 4R, amaranth, carmoisine and fast red E, which turned orange from yellow. Sunset yellow also changed to deep orange. But indigo carmine and erythrosine did not show any colour change.

In all cases except indigo carmine and erythrosine, the extent of corrosion rose with increasing concentration of the colours. While carmoisine was the most corrosive of all colourants erythrosine was the least.

Acetic acid was found to be the most corrosive, followed by citric acid, lactic acid, malic acid and tartaric acid.

Another significant finding is that ponceau 4R, which itself is very corrosive, becomes less corrosive in the presence of additives, whereas erythrosine, which is the least corrosive of all colouring agents, becomes the most corrosive in the presence of additives. (P.T.I. Science Service 8(9), 1989, 2)

## PROCESSES

## 197 Saffron stigmas produced in vitro

Researchers at Ajinomoto Co (Tokyo, Japan) have succeeded in producing saffron stigmas in vitro, opening up the way for the mass production of the world's more expensive spice. The technique was drawn from biotechnology related studies performed by plant scientists at Ajinomoto.

Saffron's high price derives from the short supply of stigmas and the enormous number needed to make spice. More than 500,000 are necessary to obtain 1 kg. of saffron. Produced in Spain, Kashmir (India), Afganistan and a few other countries, the saffron blooms for two weeks annually during which it must be picked by hand and dried. (Chemical Weekly 34(40), 1989, 81)

198 A genetically-engineered yeast to ferment cassava to alcohol

Cassava is chiefly starch, not easily digestable sugars, unlike sugarcane. It does not yield readily to the yeast that breakdown plant material and produce alcohol. Researchers at the University of Sao Paulo's Institute for Biomedical Sciences have developed a new yeast with the ability to ferment Cassava effectively.

The researchers added to a yeast strain, the genes for three extra enzymes. One gene - a mouse gene for a pancreatic enzyme that helps break down starch into sugars - was introduced using genetic engineering techniques. The researchers then crossed the resulting yeast strain with two others until they obtained a hybrid that produces almost all the enzymes needed to break down cassava efficiently. The research group is now trying to add the gene for one last enzyme. With that, the fermenting ability of the yeast should be high enough to make cassava derived ethanol marketable. (Chemical Weekly 34(42), 1989, 77)

199 Fuel from fruit

A West German scientist claims to have found a renewable source of energy in the fruit of the calabash tree, known as vilaiti bel in Hindi, reports Environment News Digest. After eight years of research in Nicaragua and other countries, he says ethyl alcohol produced from the fruit could replace petroleum. The study shows that the alcohol produced from the fruit has an octane value of 106. (Deccan Herald 6 August 1989, 8)

200 Quick ageing of liquor

Eminent Indian molecular technologist Dr. R. Rank has developed a new process to advance the maturing of alcohol instantaneously which imparts characteristics of 20 years aged alcohol in 20 minutes. The process called 'straining of cho molecules' has been developed for the first time in the world, reports UNIFIN.

The present process to mature potable alcohol is to keep it for specified years in oak wood casks or barrels.

Dr. Ranks' process eliminates the prolonged process of aging or maturing the barrel, by incorporating modifications in the alcohol molecules through intensive stressing and straining.



Dr. Rank has developed various new methods for alcohol fermentation, distillation and blending, which have been employed by leading distilleries and breweries in the country.  
(The Economic Times 10 August 1989, 4)

## 201 Protecting cheese against listeria

A British biotechnology company has developed a method of protecting cheese from infection by listeria bacteria.

The technique uses listeriaphages - a parasitic organism which works by attaching itself to the outside wall of the bacteria injecting their genetic material which takes over the bacteria's own reproductive mechanism. Instead of young bacteria, new listeriaphages are reproduced. The bacterium dies and breaks open releasing hundreds of new listeriaphages to attack the listeria bacteria.

Once the cheeses are made they are particularly vulnerable to listeria infection if not stored correctly. However if listeriaphages are added during the cheese-making process, they will remain active for the life of the cheese and are capable of attacking the bacteria if they infect the cheese and start to multiply at any stage.

(Deccan Herald 24 August 1989, 1)

## 202 Waste-fuelled copra dryer

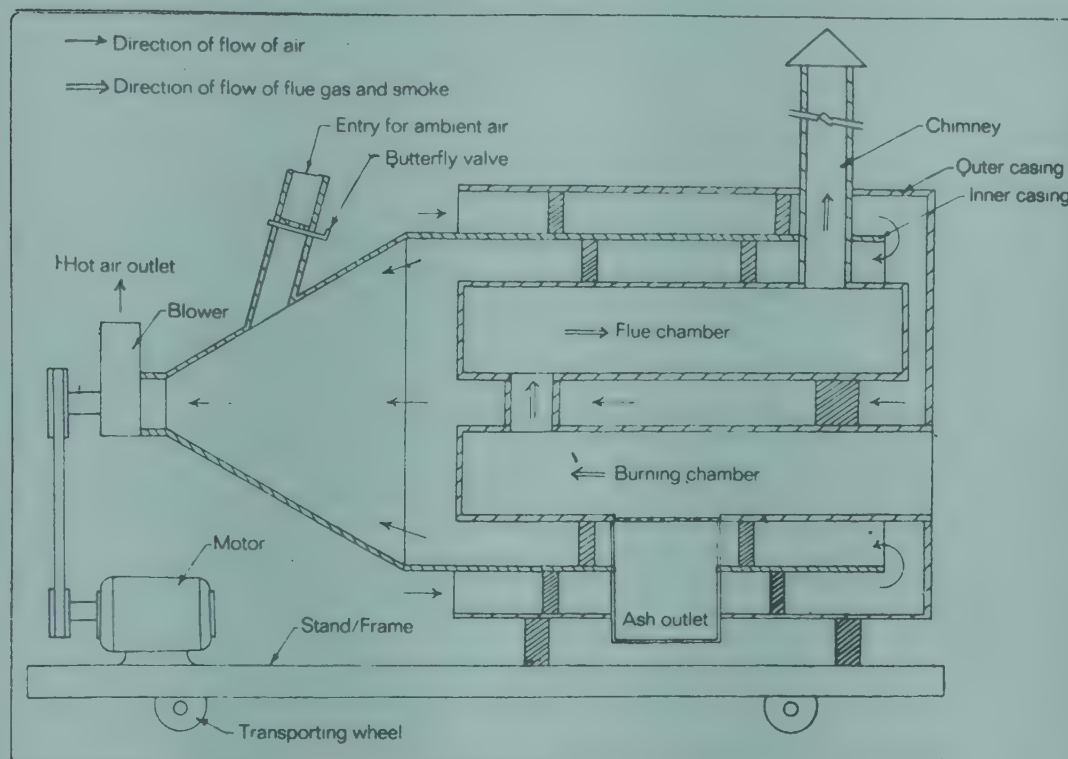
Sun and kiln drying are generally used for copra. Owing to the prolonged heating period in these practices, the coconut meal becomes susceptible to mould and fungal attack besides browning, which result in deterioration of the oil.

Mechanical drying is costlier than sun-drying. The cost of fuel is mainly responsible, especially when petroleum products or electrical energy is employed. To reduce costs, a batch bin dryer coupled with an agricultural waste-fuelled furnace was developed at the Department of Agricultural Processing, Tamil Nadu Agricultural University, Coimbatore.

The dryer consists of an agricultural waste-fuelled furnace, blower and a rectangular shaped holding bin. The unit is provided with rubber wheels for easy transportation.

The furnace is essentially a heat exchanger comprising mainly flue and burning chambers, encased in two concentric metallic casings as shown in the schematic diagram. This can generate heat by burning agricultural wastes, including coconut husk and shell. Any desired hot air temperature upto 90 C, can be obtained by suitably mixing the hot air with the ambient air, using adjustable butterfly valve provided.

The dryer was tested for drying of copra and found that a batch of 2,500 nuts at 50 per cent moisture content could be dried to seven percent moisture content within 20 hours at an optimum drying air temperature of 65 C. Conventional sun drying or kiln drying needs a drying period of seven to 10 days for the same reduction of moisture content.



The cost of dryer, including all accessories, is Rs.15,000. Drying a tonne of coconut in the mechanical dryer works out to Rs. 356 as compared to Rs.204 by sundrying. However, the quality of the copra dried by mechanical dryer was superior than that by sun drying. Drying can be done throughout the year irrespective of weather conditions using the mechanical dryer. This dryer can also be used for cereals, pulses, and other oilseeds.

For details contact: V.V. Sreenarayanan, College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore.  
(The Hindu 12 July 1989, 24)

## 203 Improved processing of cuttle fish

Scientists at the Central Institute of Fisheries Technology (CIFT) have discovered that removing the liver from cuttle fish before processing reduces the cadmium content.

Cadmium is a highly toxic element found in the marine environment, which accumulates in the liver of cuttle fish in high concentrations.

The researchers observed that the cadmium level in cleaned squid tubes and cuttle fish fillets is 0.2 - 0.4 ppm well below the permitted level of 2 ppm.





antastarin solution. Thereafter, it is dried in sun and later soaked in sugar solution. The dried fruit can be a superior substitute to other dried fruits.

(Chemical Weekly 34(40), 1989, 83-84)

## EQUIPMENT AND MACHINERY

### 206 Seed extraction machine

An axial-flow vegetable seed extraction machine for extracting seeds from vegetable fruits such as tomato, brinjal, chillies, cucumber and watermelon has been developed by the agricultural scientists of the Punjab Agricultural University (PAU), Ludhiana.

According to experts, this machine is economical, faster, safe and hygienic for seed extraction from vegetable fruits in comparison to manual practices. Two firms in Punjab are manufacturing it.

The machine works on the principle of 'wet seed extraction' and uses freshly-harvested ripe vegetable fruits. It comprises a frame feeding chute, primary chopping chamber, crushing chamber and a centrifugal pump. Vegetable fruits are cut into small pieces with blades in the primary chamber and crushed finely by means of blades again in the crushing chamber.

Conveying rakes are provided in two rows on the shaft which move the pulp and waste material along the shaft length to eject the waste. Three pipes one on either side and one on the top cover of the machine, spray water under pressure from a small centrifugal pump. The sprayed water washes out the seeds and a fraction of the finely crushed fruit material which passes through the openings of the concave screen provided at the crushing chamber and is ejected through the speed outlet.

The concave screen can be easily removed and refixed to suit seed sizes of different vegetables, with small (5 mm), medium (10 mm) and large (12.5 mm) openings. The machine is operated with a two horsepower (HP) electric motor. Three persons are required for its working, two for feeding vegetable fruits and one for removing the pulp from the screen placed below the seed outlet on a tub.

The water, containing finely-crushed seed material, is collected in a trough. Seeds are separated and settle at the bottom of the trough. Fresh water is added two or three times to clean the seed and the water is removed by decantation. The seeds thus obtained are sun dried.

Tomato seed needs special treatment since it is surrounded by mucilaginous material.

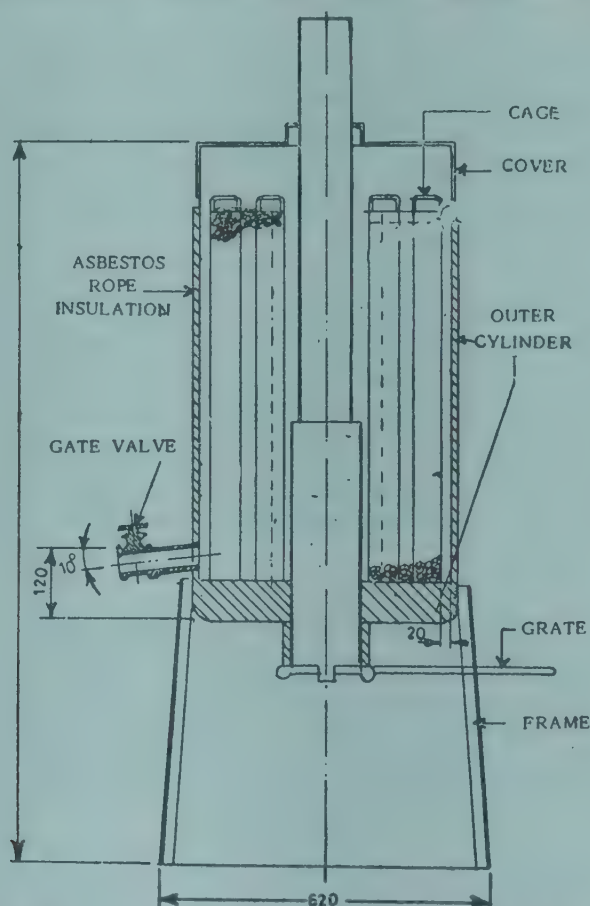


The machine can extract seeds at the rate of 5.49, 3.78, 9.42, 4.68, 3.60, 6.60, and 1.42 kg seeds per hour of brinjal, tomato, chillies, summersquash, watermelon, squashmelon, and cucumber respectively. The maximum seed loss is to the extent of 5.86 per cent in tomatoes, followed by 5 per cent in cucumber.

Seed germination is higher with mechanical extraction in comparison to manual extraction.  
(Research and Industry 34(1), 1989, 89)

## 207 Soyabean blanching unit

Soyabean is a rich source of protein (40%) and oil (20%). However, it also contains anti-nutritional factors like trypsin inhibitor, hemagglutinin, saponins and allerginins, which should be taken care of prior to human consumption. Most of these factors being thermolabile could be easily removed by simple moist heat treatment. Soyabean use would become more wide-spread if it could be processed in rural areas. A low cost blancher designed and developed at Central Institute of Agricultural Engineering, Bhopal is a step in this direction.



### Design

The blanching unit (Fig 1) is made of 22-gauge GI sheet metal with two concentric cylinders. The central cylinder serves as a burning-cum-heat-exchanging unit, and its lower and upper portions have different diameters - 12 cm and 10 cm, respectively. The diameter of the outer cylinder is 45 cm. The material for processing is kept in hot water held in the annular space between the two cylinder. The outer cylinder is insulated with flattened asbestos rope and plaster of paris. For convenience of loading and unloading and to facilitate reuse of the hot water, the soybean dal is kept in four

cages made of perforated MS sheet with zinc or chromium plating. A gun-metal valve is provided to drain the water after processing.

### Operation

About 70 l. of water is filled in the annular space and heated to boiling temperature. The four cages with 5 kg soybean dal each are then lowered in the boiling water and the temperature of 100 C is maintained for 60 min. The cages are then taken out. The soybean after this treatment is fit for consumption. The treated soybean is finally dried to make flour.

### Economics

The capacity of the unit is 100 kg of soybean per day. The fuel requirement is 3.5 kg per batch of 20 kg soybean. The cost of the unit being about Rs. 1,300, the cost of processing works out to only about 20 Paise/kg. The thermal efficiency of the unit is as high as 31.18% with reuse of hot water for processing subsequent batches.

The unit uses agricultural waste as fuel. It is very simple to operate. It can also be used for parboiling of paddy and wet heat treatment of a variety of cereals and pulses at the rural level.

For details write to: R.T. Patil, Central Institute of Agricultural Engineering, Nabi Bagh, Borsia Road, Bhopal-462018. (Invention Intelligence August 1989, 378-379)

## 208 Improved mobile corn sheller

In response to the need to reduce shelling losses due to technical deficiencies, an improved mobile corn sheller has just been developed by NAPHIRE in the Philippines under the ASEAN-Australia Economic Cooperation Programme.

Before the improved design was made, three (3) types of existing shellers; the crushing, non-crushing and semi-crushing type shellers were tested and evaluated to determine their operational deficiencies. The design of the improved mobile maize sheller comes from the results of the performance testing and evaluation conducted.

Major improvements include modification in the power transmission system of the existing design resulting in a more compact design for better mobility, baffles and rasps on the shelling concave to increase shelling recovery; and application of suction air to separate light impurities from the shelled grains.

All these modifications make the new machine more efficient and easy to operate and maintain.

This prototype was field tested in Isabela, Philippines. Results from the evaluation revealed that the improved machine performs better than existing commercial shellers. It obtained the highest efficiency of 97.11%; lowest mean unshelled loss of 0.14%; lowest mean damaged grain of 2.75% and the lowest mean impurities of 0.79% among the crushing type sheller when shelling at 22.35% moisture content corn.



Considering the losses due to shelling which as in the case of the Philippines in 1986 was estimated at 17,766.75 metric tons equivalent to US \$ 5.14m, savings through the use of the new improved corn sheller could result into millions of dollars.  
(Asean Food Handling Newsletter No.32, 1989, 9)

#### 209 Hygienic cleaner for industry

Three-in-one, CHLODET liquid, a balanced combination of Active Chlorine plus Wetting and Penetrating agents, is specially designed for achieving the required high - standard of hygiene and cleanliness in Dairy and Food Processing industries very economically.

Because of its unique ability to penetrate even the organic soil and kill the micro-organisms, the action of CHLODET is uniform and destroy all types of micro-organisms, including that which are not affected by other disinfectants. The broad spectrum of CHLODET action includes bacteria, bacterial spores, viruses, algae, fungi, moulds and yeast. It also reacts with the putrid organic waste matters and destroy the foul odors effectively.

For further details, contact: Coronet Corporation, 3, Nilkanth Sadan, Peru bagh, Aarey Road, Bombay 400 063.

#### 210 Powder sifter

The Rota-Sift is a centrifugal unit used for the continuous separation of dry or moist materials, even those that tend to ball or agglomerate. It can handle a variety of chemicals, pharmaceuticals, foods, dairy products, animal feed and powders or granules. Material is uniformly fed into the cylindrical sifting chamber by means of a feed screw which discharges the material into a rotating helical paddle. Centrifugal force accelerates the movement of the particles against the screen. The rotating paddles, which do not contact the screen, break up soft agglomerates and propel individual particles through the screen. Oversized particles, hard lumps and trash are ejected and pass directly to the discharge spout.

For more details write to: Age Technologies Private Limited, 712 GIDC Makarpura, Vadodara, Gujarat 390 010.  
(Chemical Products Finder 8(2), 1989, 26)

#### 211 Carton sealing machine

The 3 AM Econopack automatic taping machine from ITW-Signode can apply BOPP or rigid PVC pressure sensitive sealing tape on the top and bottom of cartons simultaneously. Being a twin mast design and having a top and bottom positive belt drive, full closure of flaps is ensured. Specially designed machines are also offered for non-standard applications. The carton sealing machine is ideally suited for high speed, effective sealing of centre meeting cartons in industries like food processing, drug and pharmaceutical, breweries and



distilleries etc. Econopack is backed by Nagarjuna Signode's servicing personnel and total spares availability.

For further information write to: Nagarjuna Signode Ltd., Nagarjuna Hills, Panjagutta, Post Box 1520, Hyderabad 500 482. (Industrial Products Finder 17(9), 1989, 36)

## 212 Packing of confectionery

Autowrap BD 16/32 is a versatile and fully automatic vertical form-fill-seal type packaging machine. This machine can be used for packing free flowing solids like powders, tablets, grain, toffees, etc., as well as liquids like milk or oil depending on the filling attachment. Laminated or co-extruded or virgin films can be used for pouch forming. Constant heat sealing or impulse heat sealing can be used on this machine depending on the requirement. In case of impulse heat sealing, chilled water is required to cool the seal. The film roll is mounted at the rear of the machine on a quick change-over mounting bar. The film is guided over different guide rollers on to the forming shoulder. When the film passes over the forming shoulder it assumes a tubular shape on the forming tube. Here the centre sealing jaw seals the side edges of the film to form the tube. This tube is pulled with the help of draw-off belts. The formed tube is now sealed at the bottom with the help of cross sealing jaws. As soon as sealing starts, the filling device fills material into the pouch. At the end of cross sealing, a knife is actuated to cut the tube to separate pouch from the tube. After completion of filling and sealing, the tube is again pulled with the help of draw-off belts to form the next pouch and the cycle repeats. The machine works on 415 V 50 Hz 3-phase 4-wire AC supply. Different systems of the machine are working on mechanical and pneumatic principles with the electrical and electronic controls. Provision for photo-mark sensing device and date coding device can be made on the machine. The weigher is designed to handle discrete product, i.e. product of more than one gram unit weight. The weigher can be used to feed a packaging machine or a container filling line. Each weighing system consists of a load cell with weighing container, a set of feeding trays, pre-weighing system, hopper and electronic controller.

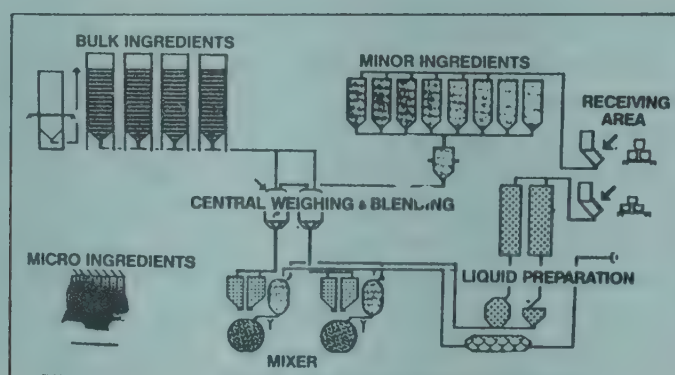
For more details write to: Nichrome Metal Works, 46, Dr. Ambedkar Road, Near Sangam Bridge, Pune, Maharashtra 411 001. (Chemical Products Finder 8(2), 1989, 10)

## 213 Bulk storage and automated pneumatic handling of ingredients for food and chemical industry

Dietrich Reimelt, Fed Republic of Germany offers custom built systems for major, minor and micro ingredients that will ensure saving of time and exact control of material, simplify process and increase plant performance, productivity and consistency of end product. Reimelt outdoor silos are provided with well ventilated thermo-protection filter room which helps to minimise condensation build-up inside the upper surface of stored materials and provide weather protection to the filters. The air can be preconditioned for



regions having high humidity or when handling hygroscopic materials. Depending upon the raw materials stored, either fluidised bed, vibratory bottom or mechanical discharge aids are used. The fluidising system is unique for its design, in that it allows silo aeration and guarantees first-in, first-out mass flow discharge. Equipment offered are bag dump and bulk tanker receiving stations, indoor/outdoor silos, pressure/vacuum conveying system, sifters, mixers/pneumatic blenders, rotary airlocks, diverter valves, filters, metering screws, electronic weigh scales and integrated computerised system which controls raw material conveying of dry and liquid products, true recipe preparations, weigh-scale tolerance and inflight compensation, logging of total material consumption, work preparation with immediate accessible memory and material flow via video display and printout.



For more details write to: D Reimelt KG, 6 Prachi, Off Bhandarkar Road, 913 S Nagar, Pune, Maharashtra 411 004.  
(Chemical Products Finder 8(2), 1989, 26)

## 214 Food extrusion equipment

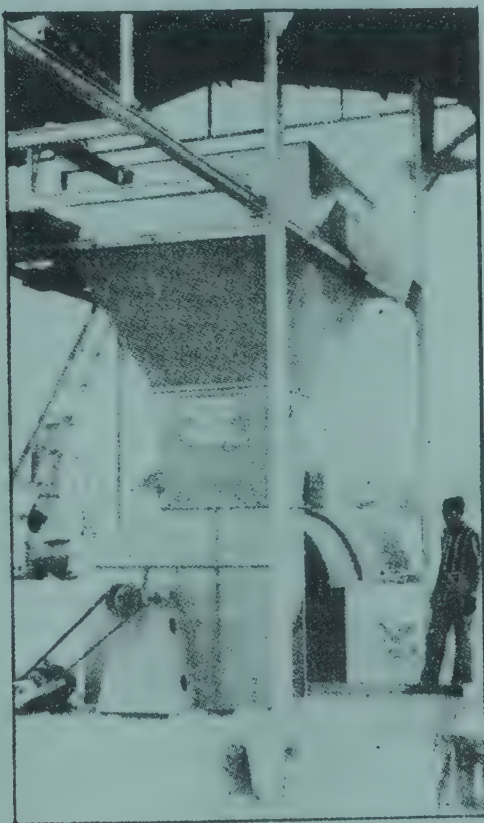
Age Technologies has developed a range of equipment for snack and pet food extrusion - to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present, modify or sterilise by products, and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function. Auxiliary equipment is also available from Age Technologies to clean and mix raw materials, cool extruded products, and apply flavour.

For more details write to: Age Technologies Private Limited, 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.  
(Chemical Products Finder 8(1), 1989, 90)

**215 A new solar dryer for rice**

A new type of solar dryer for rice is now being manufactured in Sri Lanka as a result of an energy project arranged by the CHOGRM Consultative Group on Energy assisted by the Commonwealth Secretariat's Industrial Development Unit (IDU).

The project is reported to be improving the quality of parboiled rice, giving paddy farmers a better rate of return and reducing energy requirements for drying. The solar dryer is proving to have many advantages over the conventional mechanical type commonly imported to Sri Lanka. It is much faster, requires 30 per cent less energy and has lower operating and capital costs. (It uses paddy husk as a cheap fuel and reduces environmental pollution). It also reduces discolouration and breakage of grains.



The dryer, of the forced convective type and with a capacity of 0.35 tonnes, can be used for drying parboiled rice and raw paddy in preparation for milling. It consists of three main elements: a solar-regenerated dessicant (silica gel) cooler for storage of raw paddy; a low-cost batch type fluidised bed dryer for parboiled rice, and an efficient furnace, fired by rice husks, to heat air for the drying operation.

The design has its roots in Australia. After gaining the IDU's approval for the designs, the engineers at the Rice Processing Research and Development Centre (RPRDC) of Sri Lanka fabricated and tested the dryer, making final modifications.  
(Asia-Pacific Tech Monitor March-April 1989, 5)



## 216 Agitated vacuum pan dryer

An agitated vacuum pan dryer which mixes and dries in one operation has been developed by a British company. The Calmic vacuum-pan dryer has been designed to meet the needs of the pharmaceutical, chemical and food industries, and is particularly suitable for handling heat sensitive materials. Available in a range of sizes, the dryer is of crevice free stainless steel construction with mechanical seals. For easy access to the drying compartment, the lid can be automatically lifted or swung to one side on a davit arm. To eliminate dust hazards, the vacuum system can be used to assist product feed through the loading port. Heating can be by steam or heat transfer oil, and discharge is through an automatic valve.

For further information write to: Euro-Vent Ltd., Calmic Division, Govan Road, Fenton Industrial Estate, Fenton, Stoke on Trent ST4 2RS, U.K.

(Industrial Products Finder 17(8), 1989, 40)

## 217 Grinding plant

Batliboi offers a complete spice grinding plant comprising cleaning, pulverising, mixing and packaging systems. The plant has been designed for pulverising spices to the finest quality without affecting their vital properties. Its various stages of operation are cleaning of spices by eliminating particles and impurities like stones, sand, stems, sticks, strings, etc. and thereafter pulverising the same through the high-tech pulverising system with auto-servo control to monitor the feed rate uniformly. This minimises chocking as well as clogging of the oilbased materials. It also includes a built-in heating system which obviates the conventional sun-drying process. Sieving machine ensures separation of coarse and fine powder. The next operation takes place in the mixing unit in which the mix-masala and the curry powder are prepared. Finally the powder is dosed and packed in a fully automatic packaging machine in 50 g, 100 g and 250 g packets. Batliboi has set up such plants for a number of spice manufacturers in the country. The company also offers systems for grinding foodstuffs and herbs, the latter for ayurvedic medicines. The standard pulverising equipment like pre-crushers, hammer mills, pin pulverisers and micro pulverisers find applications in food processing, pharmaceuticals, chemical and plastics industries.

For more details write to: Batliboi and Company Ltd., P.O. Box 479, Bombay 400 001.

(Chemical Products Finder 8(2), 1989, 6)

## 218 Ultrafine filters

Kumar Process Consultants and Chemicals manufactures a range of filter housings and cartridges for ultrafine filtration requirements. The cartridges are rated for absolute retention up to 0.01 micron. Spiral wound, pleated or sintered cartridges are available in such materials as polypropylene, nylon, PTFE, glassfibre, sintered stain-

less steel, sintered bronze, etc. Filter housings are made in stainless steel, PVC, PVDF, PP or polycarbonate materials. The ultrafine filters are suitable for ultrafiltration of several demanding products in the chemical, food and beverages industries. Also manufactured are a range of air sterilisation and laboratory filters.

For more details write to: Kumar Process Consultants and Chemicals Pvt Ltd., Botawala Bldg, No.2, 2nd floor, Room No.1, 8 Horniman Circle, Bombay 400 023.

(Chemical Products Finder 7(12), 1989, 86)

## 219 Improved oil expeller

A prototype of an improved oil expeller has been designed and developed at the Mechanical Engineering Research and Development Organisation (MERADO), the Central Mechanical Engineering Research Institute, Ludhiana.

Most of the 36,000 odd oil expellers now in use in the country have frequent breakdown and consume more power. The oil content of the cake produced in these expellers ranges from eight to 12 per cent. The high content of residual oil is attributed to inefficient design, poor manufacturing technology and use of low grade materials.

In order to increase the amount of oil expelled, a project for development of modern oil expeller with a crushing capacity of 10 tonnes per day was undertaken at the MERADO as part of the technology mission on oil seeds. The prototype developed at MERADO leaves residual oil of four to six per cent in the cake and consumes less power than the expeller now in use.

Working life of the wearing components has been improved by choosing proper materials, ensuring proper metallurgical control and using hard surface coatings. Similarly, power transmission efficiency has been improved by re-designing the gear box and auto lubrication of all friction surfaces.

(Economic and Commercial News 19(16), 1989, 13)

## 220 Spotlight on freshness

Scientists say they can tell whether a melon is ripe by how much light it absorbs. A US Agriculture Department scientist has developed a meter the size of a breadbox that shines near-infrared light on a melon and, depending on how much it absorbs, determines how sweet it is.

"The more infrared absorbed, the sweeter the fruit", said Dr. Gerald G Dull, who works in the department's agricultural research service. "Sweetness is the primary measure of a fruit's ripeness", he said.

Eventually shoppers will be able to test their own fruit with flashlight-sized meters. But in the meantime, he is trying to perfect the device for fruit growers and shippers.



The meter is now being tested in the field at the University of Georgia's coastal plains experiment station in Tifton, Ga.

The sweetness of melons of different types, sizes and stages of ripeness will be measured and the results compared with actual chemical analyses to further calibrate the device.

Dr. Dull said he and Gerald S. Birth, who recently retired from the department, are working to refine light meter technology to measure ripeness in a variety of fresh produce. So far, tests have been successful on onions and papayas. "Peaches and plums are next," he said.

(Decoan Herald 13 July 1989, IV)

## PACKAGING

### 221 Metallised paper

Champion metallised papers will be introduced in the country for the first time by Champion Packaging Industries.

This is a direct and cost saving substitute to the aluminium foil laminates being currently used. This has just a minute amount of aluminium deposited on its surface to give it the appearance of laminated aluminium foil.

The beauty of the metallisation technique is that it eliminates the need to laminate aluminium to paper and requires only a fraction of the aluminium needed for foil.  
(Financial Express 4 June 1989, 7)

## ANALYSIS

-Nil-

## COMMERCIAL INTELLIGENCE

## PRODUCTION (Raw Material)

## 222 All-India final estimates of crops, 1987-88

Production: '000 tonnes		
	Area	Production
Potato	885.4	14,138.4
Black pepper	158.5	49.2
Chillies	738.0	574.6
Ginger	53.7	135.5
Guarseed	1,108.2	148.0
Tapioca	269.7	5,212.5
Cardamom	115.73	9.49
Coriander	484.5	243.0
Garlic	79.4	286.7
Turmeric	107.7	294.9
Banana	289.6	4,767.1
Sweet potato	164.0	1,346.7
Onion	259.1	2,553.5
Coconut	1,428.7	7,562.3
(in million nuts)		

(Agricultural Situation in India March 1989, 1087)

## 223 All-India final estimate of oilseeds production, 1986-87

(Production in tonnes)	
Groundnut	60,78,765
Sesamum	4,43,179
Rapeseed and Mustard	27,14,383
Nigerseed	1,32,097
Sunflower	4,35,596

(Agricultural Situation in India, April 1989, 59-79)



## 224 All-India final estimates of coconut production in 1986-87

(Production in thousand nuts)

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Andhra Pradesh	1,98,833
Assam	68,711
Goa	1,06,300
Karnataka	10,72,378
Kerala	30,68,025
Maharashtra	76,326
Orissa	1,29,995
Tamil Nadu	13,80,800
Tripura	2,750
West Bengal	2,23,760
Andaman & Nicobar Islands	34,438
Lakshadweep	24,600
Pondicherry	18,063

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All-India	64,04,979
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(Agricultural Situation in India, April 1989, 80)

## 225 Rise in milk production

Milk production in the country has risen from 20.0 million tonnes in 1960-61 to 46.0 million tonnes in 1987-88 and 48.7 million tonnes (anticipated) in 1988-89. This shows the overall increase in productivity of milch cattle and buffaloes that has taken place in the meantime.

(Economic and Commercial News 19(32), 1989, 1)

## PRODUCTION (Industrial)

## 226 Production of processed foods

(Tonnes)

Product	1986	1987	1988
<b>BAKERY</b>			
Biscuits	137500	139000	141000
Bread	123000	125000	129000
<b>SOFT DRINKS</b>			
(million bottles)	1770	1800	1950
<b>COCOA PRODUCTS</b>			
Chocolate	7700	7850	8100
Cocoa powder	250	265	290
Drinking chocolate	350	365	385
<b>DAIRY PRODUCTS</b>			
Butter	12000	12250	12375
Ghee	22000	22250	22700
Condensed milk	7800	8200	N A
Baby food	52000	53500	53800
Malted milk food	25200	25500	26760
Ice-cream	10600	10800	11100
<b>FRUITS AND VEGETABLES</b>	56700	58000	60000
<b>MEAT PRODUCTS</b>	21000	21500	22700
<b>INSTANT FOODS</b>			
Coffee	6000	6500	6825
Tea	1172	1250	1295
Macaroni/Noodles	7850	8000	8400
Snack foods	240	255	267

(The Economic Times 10 August 1989, II)

## 227 Alcohol production in some states

(in lakh tonnes)

State	1987-88	1988-89 (Est.)
Maharashtra	1622	1980
Uttar Pradesh	1746	3087
Tamil Nadu	640	954
Karnataka	452	498
Andhra Pradesh	600	747
Gujarat	316	511
Haryana	166	180
Punjab	199	318

(Chemical Weekly 34(44), 1989, 99)



## 228 Production of vanaspati

(Lakh tonnes)

1986-87	9.18
1987-88	9.80
1988-89	9.56

(The Economic Times 24 August 1989, 9)

## 229 Rise in iodised salt output

The production of iodised salt touched 2.014 million tonnes during 1988-89 as against 1.687 million tonnes during 1987-88, thereby registering an increase of 19.4 per cent.

The Government had, it may be recalled, decided to iodise the entire edible salt in the country by 1992, in a phased manner. It had also decided to subsidise iodised salt production by way of free supply of potassium iodate. The programme has already been included in the Seventh Five Year Plan with an outlay of Rs.210 million. In fact, in one of the biggest health care programmes, about 5.2 million tonnes of salt is to be iodised by 1992 to cover a population of 800 million.

In order to encourage the production of iodised salt, the Government has given certain incentives to iodised salt manufacturers viz., bearing the cost of chemical used in iodisation, priority for movement of iodised salt by Railways, free technical assistance and quality control. In order to ensure proper level of iodisation, quality control laboratories have been established at various centres in Gujarat, Rajasthan, Tamil Nadu and Maharashtra. It is one of the health care programmes which has been successfully implemented since its revamping in 1986. Central Salt Department, under the Ministry of Industry, has been made the nodal agency for monitoring production, distribution, quality control and subsidy payable to iodised salt manufacturers. (Economic and Commercial News 19(27), 1989, 11)

## EXPORT

## 230 Cashew exporters cry foul

The cashew industry has suffered a major setback in the wake of the government decision to withdraw the cash compensatory support (CCS) to value-added cashewnuts in consumer packs.

The cashew exporters point out that this decision has come at a time when Indian cashew was making its presence felt in the global market.

According to industry sources, few others have been able to carve out a niche in the US market, conforming to the standards of the US Foods and Drugs Administration. With the government's new move, the country would lose substantial foreign exchange, it is felt. (Business World 9(3), 1989, 27)

## 231 Export of food commodities

Significant increases in the production of fruit and vegetable products, steady growth of licensed units and tremendous progress of poultry industry are some of the achievements of the newly established Ministry of Food Processing Industries during 1988.

According to the Annual Report of the Ministry, during the period January to December, 1988, export of fruit and vegetable products were 49,389 tonnes valued at Rs.598.9 million. The major items of export were fruit juices, pulps, jams, pickles and chutneys, canned fruits and vegetables, concentrated pulps and juices, dehydrated vegetables, frozen fruits, pulps and freeze-dried green pepper.

### Milk Products

According to the Report, indigenous production of milk powder and infant milk food has risen from 22,000 tonnes in 1970 to about 100,000 tonnes in 1987, which has certainly laid a strong base in milk processing for the Eighth Five Year Plan. During the year six letters of intent were issued for manufacture of milk powder, malted milk food, butter, ghee etc., to milk product's manufacturing units in the co-operative sector. Four letters of intent were converted into industrial licences for manufacture of milk powder, baby food, condensed milk, casein etc. There are at present 83 milk product's manufacturing plants established in public, co-operative and private sector.

During the year 1988, the estimated production of milk powder, including infant milk food, was about 1,40,000 tonnes, malted milk food including malted food about 32,000 tonnes and condensed milk about 6,100 tonnes.

### Meat and Meat Products

The Ministry proposes to improve and modernise the processing facilities for meat and meat products in order to meet the demand for internal consumption as well as for export of clean and wholesome meat products.

During the last three decades, the poultry industry has made tremendous progress and grown into an organised and highly productive agro-based industry. It achieved a production of 17000 million eggs and 120 million broilers in 1988-89. A few modern poultry processing plants have also come up recently in the private sector to produce poultry meat products.

(Economic and Commercial News 19(19), 1989, 3-4)



## 232 Non-basmati rice - Special norms for exports

The Government has decided to devise special procedure for the export of non-basmati rice.

According to the new procedure, the entire ceiling of non-basmati rice will be placed at the disposal of Agricultural and Processed Food Export Development Authority (APEDA).

APEDA will issue a ceiling slip to the exporters on the basis of registration of contracts with it backed by 100 per cent letter of credit or advance payment received in full subject to production of bank certificate from the nationalised/scheduled bank covering 100 per cent f.o.b. value against specific order or against revolving letter of credit.

The exporters will then approach the concerned port licensing authority and submit the ceiling slip issued by APEDA. On presentation of the slip, the port authority will issue export licence expeditiously and, in any case, not beyond 48 hours after presentation of the slip. Export licence will have a validity period of six months from the date of issue or up to March 31, 1990, whichever is earlier.

On the basis of the licence, exports will be allowed by the customs authorities, says an officical release.

The release says that no registration of contracts will be made by APEDA after March 31, 1990.

APEDA will stop issuing the slips as and when the ceiling is exhausted. It will not issue them after March 31, 1990, even if the quantity of ceiling is left unutilised, says the official notification.

As soon as the ceiling is reached, it will be reported to the Ministry of Commerce immediately by APEDA.  
(Financial Express 23 June 1989, 1)

## 233 Indian sea food exports

More and more people in Japan, France, Spain Singapore and a host of other countries, are relishing Indian sea food, reports PTL.

The volume and value of sea food export, mounted from 83,651 tonnes (Rs. 39,799.82 lakhs) in 1985-86 to 99,777 tonnes (Rs. 59,785.38 lakhs) in 1988-89, signifying its increasing acceptance overseas, the Marine Products Exports Development Authority (MPEDA) sources, here, said.

The comparative export figures during the past three years are: 83,651 tonnes valued at Rs. 39,799.72 lakhs in 1985-86, 85,843 tonnes valued at Rs. 46,067.28 lakhs in 1986-87 and 97,179 tonnes valued at Rs. 53,120.39 lakhs in 1987-88.

The level of export is about to touch Rs.600 crores, during the current year and the Seventh Plan target of Rs. 700 crores is likely to be achieved by early 1990, sources said.

The major countries which export Indian sea food are Japan, the USA, France, Greece, Spain, Italy, Belgium, the United Kingdom, Netherlands, UAE, Kuwait, Sri Lanka, Singapore and Hong Kong.

Sources said that frozen shrimp is the leading export item (57 per cent in volume and 79 per cent in value). Frozen squid occupies the second place, with 16 per cent and six per cent in volume and value respectively.

The MPEDA, is engaged in the task of strengthening and diversifying the production base of Indian sea food for export and has set up an ambitious annual export target of Rs. 1,100 crores in Eighth Plan. (The Economic Times 22 July 1989, 2)

#### 234 No UAE ban on Indian meat

There is no ban on the import of any brand of minced meat from India to the United Arab Emirates, the Dubai-based president of the All India Meat and Livestock Exporters Association, Mr.Suresh Subberwal, said on Tuesday.

In a statement issued here to clarify 'the misunderstandings on the subject', he said he had met the authorities concerned in the UAE and had been told that imports of minced meat from India had been cleared after appropriate tests

"I would like to confirm that as it stands, there is no ban on any brand of meat from India in the UAE", Mr.Subberwal said.

A similar statement was also issued by Mr.Pravidn Varma, Consul in the Indian Consulate General in Dubai.

He said "certain misunderstandings had blown the issue out of proportion" and that in any case, the Consulate General had officially been told that there was no ban on the imports of Indian meat. (Financial Express 26 July 1989, 3)

#### 235 Salt exports rise

There has been a 50 per cent increase in the export of salt during 1988-89. Exports in the year touched a level of 660,000 tonnes as compared to 430,000 tonnes in 1987-88. This increase has been attributed to several measures taken by the Ministry of Industry.

Significantly enough, India has exported 134,000 tonnes of salt to Japan during 1988-89 despite the fact that Japan is not the traditional importer of Indian salt. Efforts are being made to increase the export of salt to a million tonnes by the turn of this decade. (Economic and Commercial News 19(25), 1989, 9)



## 236 Spices export

The export of spices recorded a 34 per cent increase during 1988-89 over the exports in the previous year, achieving the third best performance in the history of Indian spices industry.

The volume of export increased from 70,279 tonnes during 1987-88 to 94,437 tonnes during 1988-89.

The foreign exchange earned from spices, however, fell by 5 per cent during 1988-89 compared to the best earning of Rs.298 crore achieved during the previous year because of the fall in the average unit export price of pepper.

During 1988-89, the export earnings were Rs. 282.80 crore compared to Rs. 298 crore during 1987-88. The unit price of pepper declined to Rs.45 a kg during 1988-89 compared to Rs.58 per kg during the previous year resulting in a shortage of Rs.53 crore, according to a trade analysis conducted by the Spices Board.

While analysing the commodity-wise targets and achievements in terms of quantity, pepper, cardamom (large), ginger, turmeric and miscellaneous spices recorded better performance during 1988-89 exceeding the targets set for the year.

According to the export analysis comparing with the previous year, the export of pepper increased marginally from 41,011 tonnes valued at Rs. 240.58 crore to 41,065 tonnes valued at only Rs.187.78 crore marking a fall in terms of value due to the fall in unit export price.

Export of cardamom increased from 425 tonnes valued at Rs. 4.1 crore to 1,218 tonnes valued at 12.14 crore. While the export of chillies decreased from 6,122 tonnes to 5,424 tonnes, the earnings increased from Rs.8.33 crore to Rs.12.06 crore.

Ginger exports increased from 2,628 tonnes (Rs.4.89 crore) to 5,198 tonnes Rs.9.22 crore, Turmeric from 8,747 tonnes (Rs. 9.23 crore) to 16,518 tonnes (Rs. 17.37 crore), curry powder from 2,559 tonnes (Rs.4.38 crore) to 2,735 tonnes (Rs. 5.04 crore), seed and other spices from 8,359 tonnes (Rs. 11.60 crore) to 21,792 tonnes (Rs. 20.88 crore and spice oil and oleoresins from 428 tonnes (Rs. 14.97 crore) to 487 tonnes (Rs. 18.30 crore).

The poor export performance of cardamom against a target of 2,750 tonnes set for the year was due to less demand from the Middle East market primarily on account of uncompetitive Indian price against Guatemalan offer and the predominance of domestic market with higher price.

While the quantity of spices exported in the 1960s ranged between 44,000 (1960-61) tonnes to 65,000 (1969-70) tonnes, in the 1970s it varied between 48,000 (1970-71) tonnes to 11,500 (1979-80) tonnes. Thereafter in the 1980s the quantum of export had recorded a low of 68,375 tonnes in 1981-82 and a high of 94,437 tonnes during 1988-89.

The export earnings which stood at the level of Rs. 16 crore in 1960-61, rose to Rs. 34 crore in 1969-70 and further to Rs. 155 crore in 1979-80.

(Deccan Herald 21 August 1989, 15)

### 237 Export levy on gum karaya

The recent 20 per cent export levy on gum karaya, a minor forest product that earned handsome revenue for the State Girijan Cooperative Corporation, has dampened the market. The levy has been introduced since May 5 and traders from Bombay have been shying away from buying the product.

Addressing newsmen here on Friday, Mr. L. B. Dukku, Chairman of the Corporation, appealed to the tribal co-operative marketing development corporation to take up the issue with the concerned Ministry in order to reduce the levy to a reasonable five per cent since the cause of tribals from whom the purchases are made is jeopardised.

Procurement of gum karaya by the State corporation during 1987 was Rs. 107 lakhs. It went up to Rs. 271 lakhs in 1988 and this year until May, it was Rs. 182 lakhs according to Mr. Dukku.

(Financial Express 18 June 1989, 6)

### 238 Export of oilseed meals may exceed Rs. 500 crores

Export of oilseed meals may exceed Rs. 500 crores this oil year (November to October). The official projection of export earnings during the current year with the previous year's figures in brackets are: soyabean meal Rs. 270 to Rs. 350 crores (Rs. 86 crores), rice bran extraction Rs. 70 crores (Rs. 27.4 crores), rapeseed extraction Rs. 70 crores (Rs. 3.9 crores), and groundnut meal Rs. 45 crores (nil).

According to Dr. P. V. Shenoi, Director of the technology mission on oilseeds, the export trade has been endeavouring hard to exploit the firmness in the international market due to reduced supplies from the US (soyabean meal) and China (groundnut).

Prices of groundnut extraction have already started an upward trend, due to the export prospects.

Rape/mustard seed crop is estimated at over 40 lakh tonnes and summer groundnut crop at over 22 lakh tonnes (in shell). Observers say that the total production of nine oilseeds is now expected to be around 160 lakh tonnes.

(Poultry Guide 26(4), 1989, 98-99)

### 239 Issue of advance licences

The commerce ministry proposes to issue advance licences indicating the foreign currency both in CIF (cost including freight) value of imports and FOB (free on board) value of exports.



The licences under this proposal may be issued in the same foreign currency with the conditions that there is a minimum stipulated value addition and the foreign exchange realisation is also in the same currency.

The proposal will have to be approved by the ministry of finance before it could be implemented, according to official sources.

The proposal has been mooted by the commerce ministry on a demand from exporters that the advance licence-exchange be indicated on the licence itself so that the banks and the customs authorities may ignore any excess value due to fluctuations in exchange rates of foreign currencies.

The commerce ministry feels that the proposal would, to a considerable extent, solve the problems faced by the exporting community.

(The Economic Times 20 August 1989, 1)

## IMPORT

### 240 Sugar to be imported

Sugar production plans having gone awry, the country will import about 500,000 tonnes of sugar this year, reports UNI.

Contracts for import of 200,000 tonnes of sugar are expected to be concluded shortly, according to informed sources.

Although India is the largest producer of sugar in the world, the current forecast of 9,100,000 to 9,200,000 tonnes of sugar output this year is far below expectations. The earlier estimates had projected an output of 9.8 million tonnes which was expected to go up to ten million tonnes. The industry had projected an even higher figure.

The revision in the production figures this year is attributed mainly to two factors - lower recovery of cane in many states because of weather aberrations, and diversion of cane to gur and khandsari units offering much higher prices than the sugar mills.

Undoubtedly, sugar production has been showing an increase in the past few years, from 7,017,000 tonnes in 1985-86 to 8,502,000 tonnes in 1986-87 and 9,110,000 tonnes in 1987-88.

Alongside, however, internal consumption has also been showing a steady rise, thanks to a conscious policy of liberal increases in the free sale quota. Indigenous consumption rose from 7,890,000 tonnes in 1984-85 to 8,353,000 tonnes in 1985-86, 8,775,000 tonnes in 1986-87 and further to 9,333,000 tonnes in 1987-88.

Together with the imports and the opening stocks, the total availability of sugar in 1987-88 sugar year was 11.83 million tonnes.

Against this, this year's availability is estimated at only 11.56 million tonnes.

(The Economic Times 7 June 1989, 1)

## 241 Imports of edible oils

Oil year (Nov-Oct)	Total imports	(lakh tonnes)	
		Supplies to Vanaspati	PDS*
1986-87	16.45	4.80	8.89
1987-88	18.19	6.17	10.75
1988-89	8.50	N.A.	N.A.

\*PDS: Public Distribution System

(The Economic Times 24 August 1989, 9)

## TRADE INFORMATION

## 242 India - British co-operation in food processing

India and Britain have reached an agreement on setting up export-oriented joint ventures in the food processing industry in Indian, private and public sector, reports PTI.

The minister for the recently constituted ministry of food processing, Mr. Jagdish Tytler, who held discussions with British ministers and leading food processing industrial groups in Britain in the last two days, has offered the British firms 40 per cent equity.

The agreement envisages transfer of British expertise to Indian food processing firms in training facilities for packaging, food preservation, quality control, laboratory testing, and laying down of standards in hygiene.

At least eleven British firms have come forward and their representatives will be accompanying a high level ministerial delegation to India soon to identify areas of possible co-operation for joint venture.

Mr. Tytler told newsmen the agreement was a major breakthrough for the food processing industry and would help in providing the farmers remunerative price for their produce, generating employment in rural and semi-urban areas and saving the wastage of fruits and vegetables.

Replying to questions, Mr. Tytler said "we are acquiring British technical knowhow only for export purposes".

(The Economic Times 6 July 1989, 1)



#### 243 Policy for food processing units released

The policy for setting up units in the food processing sector has been further liberalised by the Government. The MRTP and FERA companies will henceforth be allowed to set up units in categories B and C backward districts.

Earlier it may be recalled this facility was available for category A backward districts only.

According to a government press release issued in New Delhi recently, MRTP and FERA companies manufacturing canned fruits and vegetable products, protein and processed food, vegetable based weaning foods, marine products and cattle feed can now locate units in category B and C backward areas. Till now, under its delicensing policy, the government had allowed these MRTP and FERA companies to set up such units in category A backward areas only.

This additional facility has been provided because all food processing industries other than milk food, malted food and flour excluding items reserved for the small-scale sector have been included in Appendix I industries, which are also open to MRTP and FERA companies. According to the release, other terms and conditions of delicensing stipulated that have been amended from time to time remained unchanged.

(Economic and Commercial News 19(19), 1989, 10)

#### 244 Food processing industry panel set up

An exclusive development council for the fruit and vegetable processing industries has been constituted by the government. This was disclosed by the Minister of State for Food Processing Industries, Mr. Jagdish Tytler to the Parliamentary Consultative Committee attached to his Ministry.

According to the minister, the council would identify the problems of the industry and advise the government on the remedial measures to be taken. He said several companies in the US and UK have expressed their willingness to set up food processing industries in the country.

One of the committee members suggested that the food processing units in rural areas be linked to the Khadi and Gram Udyog Organisation so that loans at lower rates of interest could be made available.

Mr. Tytler said the export of fruit and vegetable products in 1985 was of the order of 50,000 tonnes valued at Rs. 598.9 million. This incidentally, was more than double the level eight years ago when 29,000 tonne products worth Rs. 220 million was exported.

(Economic and Commercial News 19(30), 1989, 11)

**245 Support price for copra fixed**

The government has fixed for the first time a minimum support price for copra of fair average quality at Rs. 1,500 per quintal for the 1989 season.

This follows the government decision to bring copra under the ambit of its support price policy with a view to protecting the interests of coconut growers. The decision is in accordance with the recommendations of the Commission for Agricultural Costs and Prices.

Announcing this in both the Houses of Parliament on Friday, Union agriculture minister Bhajan Lal said in a statement that he was confident that the minimum support price fixed for 1989 season would safeguard the interests of coconut growers.

The minister said the National Agricultural Co-operative Marketing Federation of India Limited (Nafed) was designated as the Central nodal agency to purchase copra during the 1989 season at the minimum support price, as and when needed.

Such purchases would be undertaken by Nafed in collaboration with state co-operative marketing agencies or the agencies designated by the state governments.

Mr. Bhajan Lal said the losses, if any, incurred on purchase and sale operations would be fully reimbursed to Nafed by the Union government.

(The Economic Times 22 July 1989, 1)

**246 Increase in seafood consumption**

Seafood consumption around the world is increasing. A large part of this growth can be attributed to the international concern for healthier foods. Per capita consumption of seafood is increasing in almost every developed country of Europe and North America. Two new developments, aqua-farming and surimi processing are expected to continue in Western Europe and North America.



The per capita seafood consumption in 1986-87 in some leading developed countries are as follows

	Kg
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USA	6.7
FRG	13.2
Japan	70.0
UK	20.0
France	20.0
Spain	36.0
Portugal	36.0
Sweden	36.0
Denmark	36.0
Norway	48.0
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(Chemical Weekly 34(40), 1989, 81)

#### 247 FAO aid for meat sector

The U.N. Food and Agriculture Organisation (FAO). is to assist India in modernising the meat industry sector and related activities.

An agreement signed on Tuesday provides for a \$ 100,000 project, financed by FAO's technical co-operation programme, for this purpose. To be implemented by the agriculture ministry, the project is expected to help boost meat exports, besides improving conditions in the local market.

India ranks first in the world in the population of goats (100 million) and buffaloes (75 million). It is sixth in the case of sheep (50 million). The number of pigs in India is estimated at about 10 million and that of chicken at 180 million.

Assistance from FAO will concentrate on providing the government with a detailed review of the present meat industry and guidance for future policy planning. It will also provide technical knowhow for mechanised and semi-mechanised slaughter houses inclusion of slaughter-house by-products collecting scheme in the mechanisation programme, establishment of wholesale markets and improvement of retail shops and facilities for sanitary control and meat hygiene. (The Times of India 9 August 1989, 16)

#### 248 Oils and oilseeds situation

The Union government has taken a number of measures for augmenting the production of oilseeds and oils and also to maintain the prices of vanaspati and refined oils at reasonable levels.

As a result of these measures, the production of vanaspati has increased by one lakh tonnes during 1987-88 and there has been an increase of around two lakh tonnes of solvent extracted oils during the last four years.

Some of the important measures taken by the government included: review of the vanaspati licensing policy under which the joint sector has been accorded priority after oilseed growers cooperative societies so as to ensure implementation of the projects by the state governments with reduced financial burden on their resources, according to an official release.

Usage of expeller groundnut, mustard and rapeseed and sesame oil has been allowed in the manufacture of vanaspati to provide remunerative prices to the farmers. Presently, only expeller mustard and rapeseed oil has been allowed to be used in the manufacture of vanaspati to the extent of 20 per cent. This permission is valid upto June 30, 1989. The oil usage policy has been tailored in such a way as to encourage the exploitation of non-traditional and minor oils and also to relieve pressure on indigenous traditional oils used for direct human consumption.

Relaxation in edible oilseeds and edible oils (storage control) order has been given for storage of oilseeds. Directives have been issued to the Reserve Bank of India for increase in the credit limit under the Selective Credit Control scheme. The minimum support prices in respect of certain oilseeds have been fixed so as to ensure a remunerative return to the farmers.

Import of edible oils for allocation to the vanaspati industry has been reduced substantially so as to exploit the indigenous minor and non-traditional oils.

Subsequent upon fixing the minimum economic capacity for the vanaspati industry, about 16 units have expanded their capacity by about one lakh tonnes per annum.

Fiscal incentives in the form of excise rebate on the usage of solvent extracted mustard and rapeseed, sunflower, safflower, mahua, palm and rice bran, in the manufacture of vanaspati were extended which has been resulted in an increase in the production of edible grade rice bran oil and mustard oil considerably, it is claimed. (The Economic Times 21 June 1989, 3)

## 249 Programmed potatoes

An American chemical engineer, Michael Kozempel of the US department of agriculture's Eastern Regional Research Centre in Philadelphia, (ERRC) has developed a computer programme to increase efficiency in the food processing industry. The programme, called the ERRC Food Process Stimulator, models the process for making instant mashed potato.



The programme, written in Fortran, runs on a personal computer and consists of the routines for processing the potatoes. It analyses every step in the process - from raw potatoes to cooked stuff and dried flakes - and accounts for variables such as the cost of electricity and labour. What is more, the programme makes corrections for imperfections in the real factory - such as unequal mixing of potatoes and water in the blancher.

The aim is to increase efficiency. For example, when potatoes contain relatively large quantities of sugar, they tend to turn too brown when fried. A factory can compensate for this either by blanching the potatoes for longer time or by raising the temperature of the water in the blancher.  
(Business World 9(3), 1989, 38)

## 250 TN govt takes over brewery

The Tamil Nadu government today announced the takeover of a new beer manufacturing unit in the city, reports UNI.

The unit, Empee Breweries and Distilleries, owned by the Madras International group of hotels, is the second to be taken over by the state government, following its new policy of taking control of liquor production announced by chief minister M.Karunanidhi in his 1989-90 budget speech.

The first unit to be taken over was the joint sector Southern Agrifurane, subsidiary of the Southern India Petrochemicals (SPIC).

An official release issued here today said the beer unit was given permission last year. However, when the government was approached for commencement of beer production after the unit was set up, the permission was rejected. The newly-formed Tamil Nadu Spirit Corporation (Tasco) has since been given permission to run the Rs. 8.5 crores unit. The Tasco would repay the Rs. six crores loan taken from financial institutions.

The unit, which would soon commence production, would brew 1,20,000 cases of beer every month initially. The capacity would go upto 2,25,000 cases in about six months.

The unit would cover 70 per cent of the beer consumption in the state.

The spirit corporation would also in stages acquire another liquor unit - a cooperative venture located at Villupuram in South Arcot district.

The beer unit, at current prices was estimated to cost Rs. 12 crores.

(The Economic Times 23 August 1989, 1)

**251 Ban on beer plants lifted**

The recent decision by the Government to lift the ban on the creation of new capacity or expansion of existing capacity of beer which has been in force since November 19, 1975 will definitely give a much desired boost to the beer industry. Till now, fresh licenses were to be issued only in cases where the production was exclusively meant for exports.

Although, some of the Indian brands of beer have found a good market abroad and compare well with the German and Danish products, one major constraint has been the freeze on capacity expansion. The industry having to cater to the expanding domestic market, exports have not been up to the extent possible. On the other hand, the policy of export-oriented units for beer has not found much favour as the viability of units based only on exports was thought to be a risky proposition.

As per the recent decision, each beer manufacturing unit will be licensed for a minimum capacity of 5000 kilolitres per annum. The units will have to meet the fund requirements for implementation of the project through their own internal resources without recourse to the Central or State Financial Institutions. MRTP and FERA companies will also be granted new capacities or for substantial expansion of the existing capacities under certain export obligations. The unit will not be allowed in tribal areas.  
(Chemical Digest 15(7), 1989, 7)

**252 Soyabean lab at Indore**

The Indian Council for Agriculture Research (ICAR) has provided Rs. 2.50 crores for construction of a modern laboratory at the National Research Centre for soyabean here. The Director of the Centre, Dr. P. S. Bhatnagar, told that the laboratory would be completed within two years. The Centre would have an exhibition hall for farmers, lecture halls, a research laboratory and library. He said the centre had been working to develop varieties of soyabean suitable to Indian conditions to enhance yield per hectare.  
(Financial Express 18 August 1989, 4)

**FOOD REGULATION, QUALITY CONTROL AND HYGIENE****253 Sugar (Control) Order 1966 (Amendment)**

G.S.R. 1193(E) Ess. Com./Sugar - In exercise of the powers conferred by clause 5 of the Sugar (Control) Order, 1966, and in supersession of the Order of the Government of India in the Ministry of Food and Civil Supplies (Department of Food) No. G.S.R. 391 (E) Ess. Com./Sugar, dated the 22nd May, 1984 the Central Government hereby directs that no recognised dealer shall hold any stock of vacuum pan sugar or khandasari (open pan sugar) for a period exceeding



seven days from the date of receipt by him of such stock and shall not keep in stock at any time -

(1) vacuum pan sugar, in the places mentioned below, in excess of the quantities mentioned against each,

(i) in Calcutta and extended area -

(a) recognised dealers who import sugar from outside West Bengal - 3,500 quintals;

(b) other recognised dealers - 500 quintals;

(ii) in other places -

(a) in cities and towns with a population of one lakh or more - 500 quintals;

(b) in other towns and areas with a population of less than one lakh - 250 quintals.

(2) Khandsari (open pan sugar) in excess of 500 quintals.

Provided that nothing in this Order shall apply to the holding or keeping of stock of sugar or khandsari -

(i) on Government account; or

(ii) by the recognised dealers nominated by a State Government or an officer authorised by it to hold stock for distribution through fair price shops; or

(iii) by the Food Corporation of India.

EXPLANATION - For the purpose of this Order -

1. "Calcutta and extended area" means the areas specified in the Schedule to the notification of the Government of West Bengal No.; 7752 FS/F.S./14 R 92/61, dated the 16th December, 1964.

2. for counting the period of holding of the stock, the date on which any stock is received by the recognised dealer shall be included.

(The Gazette of India Part II - Section 3 - Sub-section (i) No.660, 21 December 1988)

254 Rice Milling Industry (Regulations and Licensing) Second Amendment Rules, 1959

G.S.R. 1210 (E) - Whereas the draft of certain rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959 was published as required by sub-section (1) of Section 22 of the Rice Milling Industry (Regulation) Act, 1958 (21 of 1958) in the Gazette of India Part II, Section 3, Sub-section (i) dated the 8th October, 1988, under the notification of the Government of India in the Ministry of Food Processing Industries No.GSR 802 dated 1-10-88,

inviting objections or suggestions from all persons likely to be affected thereby before the expiry of a period of forty-five days from the date on which the copies of the official Gazette in which the said notification was published were made available to the public;

And Whereas the said Gazette was made available to the public on the 10th October, 1988;

And Whereas the objections and suggestions received from the public on the draft have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by Section 22 of the said Act, the Central Government hereby makes the following rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, namely:-

1. (1) These rules may be called the Rice Milling Industry (Regulation and Licensing) Second Amendment Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Rice Milling Industry (Regulation and Licensing) Rules, 1959 (i) in sub-rule (3) of rule 4, for the letters and figures "Rs. 20/-" and "Rs. 10/-", the letters and figures "Rs. 200/-" and "Rs. 100/-" respectively shall be substituted: (ii) in rule 5, for the letters and figures "Rs. 30/-", the letters and figures "Rs. 200/-" shall be substituted.

(The Gazette of India Part II - Section 3 sub-section (i) No.672, 27 December 1988)

## 255 Vegetable Oil Products (Standard of Quality) Amendment Order 1988

G.S.R. 1068(E):- In exercise of the powers conferred by sub-clause (1) of clause 4 of the Vegetable Oil Products Control Order, 1947, the Vegetable oil Products Controller for India hereby makes the following Order, further to amend the Vegetable Oil Products (Standards of Quality) Order, 1975, namely:-

1.(1) This Order may be called the Vegetable Oil Products (Standard or Quality) (Amendment) Order, 1988.

(2) It shall come into force on the date of its publication in the Official Gazette.

2. In the First Schedule to the Vegetable Oil Products (Standard of Quality) Order, 1975, for sub-clause (a) of clause (1) of paragraph 2, the following shall be substituted, namely:-

(1) "(a) It shall be prepared by hydrogenation of one or more of the following vegetable oils, namely:-

- (i) Cottonseed oil.
- (ii) Solvent Extracted Groundnut oil.
- (iii) Mahua Oil.
- (iv) Maize (corn) oil.



- (v) Nigerseed Oil.
- (vi) Palm Oil.
- (vii) Rapeseed Oil.
- (viii) Ricebran Oil.
- (ix) Soyabean Oil.
- (x) Sunflower Oil.
- (xi) Watermelon seed Oil.
- (xii) Palmolein.
- (xiii) Salseed Oil not exceeding 10 per cent.
- (xiv) Solvent Extracted Rapeseed/Mustard Oil.
- (xv) Safflower (Kardi seed) Oil.
- (xvi) Solvent Extracted Sesame Oil.

**Explanation:**

In this Order, 'Rapeseed Oil' shall mean only imported rapeseed oil".  
 (The Gazette of India Part II - Section 3. sub-section (i) No.584, 12 November 1988)

**256 Ban on mineral oils in foods**

Mineral hydrocarbons to be banned from use on food or food processing in the UK, as soon as possible. This follows after the studies by Shell Research that oils made by conventional and hydrogenation process are toxic down to very low doses.

The ban will apply to mineral oils used on dried fruit to keep them from sticking, on citrus fruits to replace the natural wax coating lost in washing and on the rind of some cheeses. It will also prohibit the use of such oils in processing of foods, such as confectionery, jellies, bread and sausages.

Furthermore, the Shell animal experiments have shown that mineral oils produced either conventionally or by hydrogenation are toxic down to very low levels. No acceptable daily intake (ADI) could be estimated by the UK Committee of Toxicity (COT).

While there is no evidence that mineral oils have had harmful effects in humans, the COT is worried by the fact that they accumulate in the lymph nodes, liver, spleen, and fatty issue of humans, which are the same organs that the oils damage in animals. The Ministry of Agriculture, Fisheries and Food will shortly issue proposed regulations to ban them in food.  
 (Chemical Weekly 34(44), 1989, 81)

## 257 No pesticide residues in Indian apples

Studies on pesticide residues conducted over the last 10-15 years by the Indian Council of Agricultural Research have revealed that in a majority of samples, residue levels were below the prescribed limits. This was stated in the Lok Sabha by the Minister of State for Health and Family Welfare, Ms. Saroj Khaparde while replying to a question raised in the lower house. The question was prompted by recent reports of contamination of apples in the U.S. and Chile.

Replying to yet another question the minister stated that in a survey conducted by the Directorate General of Health Services during the year 1987, a total of 648 samples of various commodities of food collected from the farmers and markets were analysed mainly for DDT and BHC. The results are shown below :

Statement showing name of each commodity, number of samples analysed and number of samples exceeding prescribed limit.

Commodity (Name)	Number of samples analysed	Number of samples exceeding prescribed limit
Vegetable	231	1
Fruits	181	1
Cereals	74	6*
Pulses	103	2*
Vegetable oils	52	-
Dairy product	7	6
Total	648	16

\* 33 samples of cereals and 31 samples of pulses also showed presence of DDT for which no tolerance limit has been prescribed. However, the level was below the detectable level in most of the rice and wheat flour samples.

(Chemical Weekly 34(48), 1989, 52)

## 258 Monitoring of radioactivity level in Indian marine products

The radioactivity analysis on the frozen shrimp samples conducted by the Bhabha Atomic Research Centre, Bombay revealed very low levels of radionuclides. The gamma spectrometric analysis showed that the only detected radionuclide is Cs 137 in the level of 18 Becquerel/kg which is rather negligible when compared to the derived limit of 40 Bq/Kg Cs 137 in the food material.

(Seafood Export Journal 21(4), 1989, 25)



## 259 Standardisation of steel utensils

The Indian Nickel Development Institute has suggested introduction of a national certification mark for stainless steel being used in domestic appliances.

National certification and customer education will help push sub-standard steel out of the market, the Institute Director, Mr. V.R. Subramanian, said in a statement.

A customer, guided by the certification mark and informative labelling, could make his choice of the stainless steel for his use.

The Institute has stressed the need for vigorous efforts to check and punish malpractices in pushing sub-standard stainless steel.

Mr. Subramanian said the Government should consider certification marking for stainless steels used in household utensils and kitchenware almost with the same seriousness as in certification of medicine and drugs.

Referring to recent press reports about influx of sub-standard, stainless steel in the market, Mr. Subramanian said there were utensils with nickel polish over mild steel, selling as cheap and affordable stainless steel items.

"Such malpractices should be condemned and serious action is warranted against such parties", he said.

Mr. Subramanian, however, took objection to efforts to decry the 200 series stainless steels as unsuitable and inferior for utensils.

He said although stainless steels of 301 and 304 grades were the most preferred materials for utensils as they had 18 per cent chromium and eight per cent nickel, the 200 series were well established and in use all over the world.

(Financial Express, 20 June 1989, 3)

## 260 Delhi extends ban on milk food manufacture

The Delhi administration extended the ban on the manufacture of milk food till the middle of next month.

The Executive Councillor (Health and Food and Civil Supplies), Mr. Bansi Lal Chauhan, issued the Delhi (Manufacture of Milk Food and Exports) Control Order No. two extending the ban up to August 15.

The ban will be applicable to all industrial undertakings manufacturing milk food like milk powder (whole/skimmed), condensed milk, cheese (processed) and desi ghee.

According to the order, the manufacture and export of milk food by industrial undertakings has been prohibited. Earlier, the ban was imposed on June 12 and remained in force till July 15.  
(Financial Express 27 July 1989, 6)

## 261 Eggs have less cholesterol

Eggs have 22 per cent less cholesterol than previously believed, according to a new government study in U.S.A.

The one year study by the US Department of Agriculture in conjunction with the Washington based Egg Nutrition Centre, was a welcome news to the US egg industry, which has seen declining profit in recent years partly because of health concerns.

The average large egg was found to contain about 213 milligrams of dietary cholesterol. That was significantly less than the 274 milligrams reported in government guidelines since 1976.

The fat content of the eggs was also slightly lower than previously reported, with an average of five grams total fat per large egg.

The revision is due to better testing methods and different feed, husbandry and breeding practices; according to Gary Beecher, chief of the USA's nutrition information service.

The study examined nearly 2500 eggs from producers around the United States.  
(Poultry Guide 26(6), 1989, 96)

## 262 Pan masala is genotoxic

Cancer researchers in Ahmedabad have confirmed that pan masala is "genotoxic" and have sounded a warning on its indiscriminate consumption. A substance is said to be genotoxic if it damages the cell's chromosomes containing hereditary material called genes that are passed on by parents to children.

Dr. S.G. Adhvaryu and co-workers at the Cell Biology Division of the Gujarat Cancer Research Institute have found pan masala to be genotoxic even at levels much lower than average daily consumption by a pan masala addict. The scientists said they used a popular brand of pan masala for their study.

The extract of pan masala was mixed with a test tube culture containing the growing ovarian cells of a Chinese hamster.

The scientists said that they observed chromosomal changes in hamster cells treated with extract from as little as 1.1 milligrams (mg) of pan masala.



The small pouch of pan masala sold in the market contains about 5000 milligrams, and the average daily human consumption is 6000 mg to 8000 mg, the scientists said.

The researchers warned that the chromosomal damage was dose dependent and therefore the "end effects would be the result of cumulative effect of pan masala consumed".

They said though their report was preliminary, the results "do warrant a restriction to the indiscriminate use and sale" of pan masala until further indepth studies are completed.

While tobacco chewers spit out the juice, pan masala is consumed in full. Therefore, in addition to local effects on oral mucosa, pan masala is likely to produce systemic effects as well, the scientists cautioned.

(P.T.I. Science Service 8(9), 1989, 1-2)

### 263 Peptide prevents tooth decay

Scientists at the Department of Preventive and Community Dentistry, Melbourne, have discovered a milk component that prevents tooth decay. The natural product has potential as an additive that could 'decay-proof' any food or drink. It can also repair minor tooth-decay damage. The team discovered why some foods heavy in sugar, e.g. milk chocolate, do not cause as much tooth decay as most sugar-rich products.

Tests showed that the active anti-decay substance formed part of casein, a protein which comprises about 3% of liquid milk. Confectionery manufacturers were persuaded to make a special chocolate in which non-fat milk solids were replaced by commercially available sodium caseinate, producing a three-fold increase in casein level (to 18%) without altering sugar or fat levels. The chocolate caused no decay at all, although the first blends had a noticeable after taste.

The group then isolated 21 peptides found in casein and discovered one which bound calcium and phosphate, preventing tooth decay caused when these substances are leached out of teeth by plaque acids formed by fermenting sugar, it bound strongly to teeth; and it repaired minor tooth damage by replacing calcium and phosphate.

It was then shown that the white, tasteless peptide could be readily extracted from casein and was effective and undetectable at concentrations of about 2%.

(Journal of Scientific and Ind. Research 48(2), 1989, 118)

## TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

## 264 New soft drink from HPMC

The Himachal Pradesh Marketing Co-operative (HPMC), has introduced a new soft drink, Apple-Tapple, apple juice concentrate in paper packs. The drink has been marketed on trial basis in four Southern states, the Himachal Chief Minister told newsmen here on Wednesday. It will be introduced in other states shortly he said. (Financial Express 19 August 1989, 4)

## 265 All Seasons Foods' new plant

All Season Foods' new plant at Nasik is expected to launch production soon. The plant will be making not only ready-to-eat meals but also many new products such as baby foods, milk and malt-based products and energy-based products etc. The company's current year target is to achieve a turnover of Rs. 100 crore. During 1988, its sales have increased to touch Rs. 25.76 crore. (Chemical Products Finder 8(2), 1989, 109)

## 266 Sakthi Soyas' Project

Sakthi Soyas is launching an integrated soyabean processing project in the joint sector with Tamil Nadu Industrial Development Corporation (TIDCO). The company has a technical collaboration agreement with Buhlers of Switzerland and Extraction Techniques of West Germany. The project, coming up near Coimbatore in Tamil Nadu, is poised to go on stream. The project, which will have a capacity of 90,000 tonnes per annum, will produce edible refined soya oil, defatted soya meal and edible soya flour. (Chemical Products Finder 8(2), 1989, 109)

## 267 Nestle pioneers palm - fat based milk

Nestle Malaysia Sdn., Bhd. has manufactured the first milk powder which contains palm-fat instead of butter fat in their full cream brands in Malaysia. The product is called Carnation Instant, Filled Milk Powder which is packed in 400 gm. boxes and 1 kg tins.

The milk powder is made from non-fat milk solids and refined palm oil. It contains milk protein, palm fat and milk sugar equivalent to the amount of protein, in fresh dairy milk. It also contains calcium, Vit. A and D.

The milk powder is manufactured by Nestle at its milk spray drying plant in Selangor Darul Ehaan and is said to be the first of its kind based on palm-fat. (Chemical Weekly 34(48), 1989, 83)



## 268 Lipton India diversifies

Lipton India has diversified into the food and beverages market with a range of fruit-based drinks and biscuits. In fact, the company's range of fruit-based beverages under the banner Tree Top in tetra-brick pack enjoy a strong presence in the market. Lipton also completed test marketing of its range of biscuits successfully and it has planned to extend their distribution to all potential markets. Besides the animal feeds business, dairy products business had another good year in 1988. Anikspray, skimmed milk powder, increased its market share with good distribution and marketing support.

Domestic sales of Lipton Tea brands made satisfactory progress. The company launched Taaza, a new blend of tea in pouch packaging, which has met with encouraging response.  
(Chemical Products Finder 8(1), 1989, 100)

## 269 Brooke Bond widens product range

Brooke Bond India Ltd has widened its band of consumer products with the launch of six new blends of spices mixes, which are packed in specially developed poly laminated packs to ensure the long-term freshness. The company had entered the spices market way back in 1971 by creating an export market for these items. The spice mixes were launched in 1982 in four towns initially. Now they are available in all parts of the country.  
(Chemical Products Finder 8(1), 1989, 107)

## PERSONALIA

## 170 K. M. Chandrasekhar

Mr. K. M. Chandrasekhar, Chairman of the Spices Board, has assumed additional charge as Chairman of the Marine Products Export Development Authority (MPEDA).

This follows completion of the five-year term of Mr. T. K. A. Nair as Chairman of MPEDA.  
(Financial Express 10 June 1989, 6)



# Packaging

## Some Developments in the Technology, Materials and Applications

Packaging does more than simply extend the shelf-life of food-stuffs and other consumer items or protect them from adulteration: they also need to be well presented for retail selling; and ready-to-use food-stuffs must be packaged to perform both under freezer and oven temperatures. For countries aiming to develop export markets in particular, the use of modern packaging is, therefore, essential. Packaging to international standards requires advanced materials, manufacturing, processing and printing technologies.

**R**ISING living standards and greater emphasis on production of food and other consumer items for export place an immediate demand on more widespread use of packaging. Packaging does more than simply extend the shelf-life of foodstuffs and other consumables or protect them against adulteration: they also need to be well presented for retail selling; and ready-to-use food-stuffs must be packaged to perform under freezer temperatures as well as in conventional oven environments. For countries aiming to develop export markets in particular, the use of modern packaging is essential to ensure foodstuffs are supplied to internationally accepted standards.

The traditional tin plate containers are constantly undergoing technical innovations. The trends in the manufacture of tin cans for drinks and preserved food, are in the direction of weight reduction (through continuous casting and hot/cold rolling methods), more versatility (such as rectangular shapes with round lid and base), more ease of use (for instance, air-relief valves can be built into coffee containers to permit gases to escape), and systems ecologically more relevant (press-in lids for cans for easier recovery from disposal sites with magnets).

On the growing market of ready-to-use products, glass plays an increasingly important role. Modern technologies in the glass-container industry are being consistently improved. The trends are mainly in the direction of light-weight glass and individual design. One of the new uses of glass is as a package that can go into the microwave oven. This allows food to be heated economically and efficiently.

World-wide, aluminium packaging has seen its share of innovations. For example, collapsible tubes of aluminium-plastic laminates have found widespread use for fluoridated toothpastes. Flat aluminium light-

weight containers offer shorter sterilisation times, which can improve pharmaceutical product quality. Ready-to-use packages can be heated up in microwave ovens after removal of the lid, with or without spatter-proof cover. As a means of packaging drugs, aluminium is used with increasing frequency alone or in combination with materials contributing tensile strength for push-through and tear packages. Such packages offer protection against moisture and light. In cans for beverages, aluminium is becoming ever more prevalent due to significant advances in impermeability to gases and liquids, opening convenience, possibility of hot and aseptic filling, and ecological positioning. By reducing wall thickness and scrap reduction the required gross amount of material has been reduced to half. Packages with a high aluminium percentage can be recycled. This saves up to 95 per cent of the energy required for the production of the raw material.

Today, there is a wide range of packaging systems available for aseptic filling, such as carton pack; aluminium and plastic laminates; bags of various sizes, starting with sachets to large-size bags in cartons; cases and casks; plastic cups and tubes; cans of tin and combination cans; bottles of glass and plastic; drums; and stationary and mobile storage tanks. Modern heat-sealed packages, which contain aluminium foils, can obtain impermeability values and shelf-life periods equal to conventional rigid-walled containers. Plastic multiple-layer containers are about to make their entry into this field as well.

### THE TRADITIONAL METAL CANS

In spite of the development of newer packaging materials, tinplate and its derivatives dominate the food packaging field. The traditional metal can called the open top sanitary (OTS) can, is a rigid container normally made of tinplate. It can be hermetically sealed for



packing various food products and is mainly used for thermally processed foods. The container not only withstands the temperature and internal pressure during processing but also prevents entry of micro-organisms.

The manufacture of tinplate and the techniques of can-making have evolved together over the last 150 years to compete economically and aesthetically with other packs so that the tinplate of today is a material different from that originally used at the beginning of the last century. The change from 'hot dipping' the sheets of base plate steel in tinning bath, where it was impossible to control the amount of tin to be deposited on the steel at levels below 11.2 g/m<sup>2</sup> of tincoating on each side of the plate, to electrolytic tinning in coil or sheet form has made the production of tinplate more economical. The development of differential electrolytic tincoating has resulted in further economies.

### New Materials

New materials have been developed for use in OTS cans. Tin-free steel (TFS) developed in Japan, for example, has a steel base with a chromium/chromium oxide surface replacing the tin in conventional tinplate. This new surface provides an excellent substrate for lacquer adhesion which ensures superior performance in terms of product compatibility for many food products. Another new material Litewel-N (LTW-N), is being marketed by a Japanese company for use in welded food-and-beverage cans. Consisting of a steel sheet thinly plated with tin and tin-nickel alloy, LTW-N is claimed to have corrosion resistance, weldability and lacquer adhesion properties comparable to tinplate despite containing less tin.

Aluminium is a material which can only be used for drawn can manufactured by deep-drawing process as opposed to side seam soldered/welded can normally made of tinplate. There are two methods by which drawn containers can be manufactured: (a) draw and re-draw process (DRD), and (b) draw and wall ironing process (DWI). In Europe and the USA, aluminium has found its use mostly in the field of beverage processing industry. The metal has been found to be very prone to corrosion, and because of limitations in terms of can diameters and heights, it is not favoured as a potential replacement for tinplate.

A metal container requires an internal protective finish for certain food products to prevent interaction between the product and the metal. In addition, it needs protection from the environment, that is, severity of climatic conditions, transport abuses and rough handling. To meet these requirements, organic coating materials are applied both for protection and decoration to the metal containers. Significant developments have taken place during the last decade in respect of various lacquer systems suitable for packing different food products, mainly those requiring thermal processing.

### Advantages of OTS Cans

The main advantages of the OTS cans are their functionality, convenience, tamper-proofness and get-up. The OTS can made from tinplate protects the food from physical damage, specially from rough handling and transportation. The metal cans also give longer shelf-life to the packed food items and prevent adulteration. In addition, metal cans can be printed externally in multicolour at little extra cost. Cans have also about four times more shelf-life (12 months) than pouches and Tetrapacks and need no preservatives.

OTS cans are also recyclable. Some 4.2 million used tinplate cans are separated magnetically and recycled in USA and Canada each year. Once shredded, the can scrap is returned for steelmaking. Over half-a-million tonne of high value scrap has already been used in this way, and the American Iron & Steel Institute indicates that tinplate recycling will be increased with magnetic separation facilities incorporated in almost all new recovery plants.

### THE UBIQUITOUS POLYMER PACKS

The place of traditional packaging materials like wood, paper, jute and metal is being taken over by various plastics which require comparatively less energy for production and conversion. This change has been more prominent during the last two decades. These include large tonnage plastics called commodity plastics like, polystyrene (PS), low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP) and polyvinyl chloride (PVC) and production of linear low density polyethylene (LLDPE). Other plastics which are also gaining importance in the packaging field because of certain unique properties they possess are nylon, ionomer and ethylene vinyl acetate (EVA). The three modes of plastic packaging are rigid containers, flexible packs and fabric packs. Their common applications are many.

#### Rigid Containers

Self-supporting rigid plastic containers, ranging from a few millilitres to fuel oil tanks with capacity as large as 10,000 litres, are blow-moulded. The common applications of rigid plastic containers are cosmetics, pharmaceuticals, soft drinks, edible oils, pesticides, detergents and paints. When the containers are injection-moulded, the materials used are polystyrene (PS), high density polystyrene (HIPS) and polypropylene (PP). For blow-moulding, the materials used are rigid PVC or the popular HDPE.

Pharmaceutical containers are both injection- and blow-moulded. The most common material is HDPE but for ointments and inhalers, the material used is PP. For aerated beverages, the containers used are made from polyethylene terephthalate (PET) because of transparency and better barrier properties. HDPE and



PP could also be used for non-aerated applications. Thin-walled containers injection-moulded from HDPE/PP and also vacuum/thermo-formed containers from HIPS are used for packaging products like yoghurt. Containers blow-moulded from high molecular (HM) HDPE are generally used for textile auxiliaries, pesticides, oils, paints and chemicals. For paints, sometimes injection-moulded pails from HDPE are also being used. HDPE is the most widely used material for containers for edible oils, custard powder and drinking chocolates. These are generally blow-moulded. However, PET bottles are slowly gaining popularity for packing of edible oils.

### Flexible Packs

Of late, flexible packaging has been gaining a lot of importance as compared to blow-moulded containers of similar size, primarily because of weight reduction and improved barrier properties which result from the use of different polymers in a multi-layer laminate. Even a two-layer film produced from one polymer will give better results over a single layer film of the same thickness from the same polymer as a result of overcoming pinhole effect. Such films are produced by co-extrusion technique. The polymers commonly used are LDPE, HDPE, PP, EVA, ionomer and nylon 6. The advantages of different polymers are given in Table 1. A number of combinations of these polymers used for different end applications are given in Table 2.

### Fabric Packs

Fabric made from weaving of monoaxially oriented tapes of HDPE/PP is finding increased use, *vis-a-vis* jute, in a number of industries. This is primarily because of the superior chemical resistance and good strength of such fabrics. Fabric made from PP is commonly used the world over. HDPE fabric is also popular in some parts. For instance, HDPE woven sacks are being used in packing a variety of products, such as fertilizers, foodgrains, pesticides, cement, wheat, flour, milk powder and sugar.

Besides packing of numerous consumer products, plastics are also used in the following areas:

- ☐ Stretch wrapping;
- ☐ Shrink-wrapping to produce unitized packing;
- ☐ Blister packing and strip packing of pharmaceutical products; and
- ☐ Heavy duty LDPE/LLDPE bags for packaging various products.

In addition to the above, plastics are also used as composites in combination with aluminium foil, paper, board, etc. for packaging various products like pharmaceuticals and detergents.

### Advantages of Polymer Packs

The present trend in packaging is towards a changeover to plastics from the traditional packaging materials. Among plastics also, flexible packs (up to 1 litre

TABLE 1  
ADVANTAGES OF DIFFERENT POLYMERS

Polymer	Advantage
LDPE	Good clarity
(HM) HDPE	Moisture- and oil-barrier property
PP	Toughness, rigidity and resistance to high temperature
Ionomer	Good sealability at low temperature, resistance to oil, puncture resistance
EVA	Good impact property and good sealability
Nylon 6	Gas barrier property, aroma retention

TABLE 2  
APPLICATIONS OF DIFFERENT POLYMER COMBINATIONS  
FOR FLEXIBLE PACKS

Combination	Application
LDPE/LDPE	Milk Products
HDPE/LDPE	Dried foodstuffs
LDPE/HDPE/LDPE	Edible oils and snacks
Nylon 6/EVA	Spices, coffee, etc.
Nylon 6/Ionomer	Edible oils
PP/EVA	Cheese and bread wrapping
Nylon 6/LDPE	Roasted coffee
LDPE/PP/LDPE	Bread, biscuit
HDPE/EVA	Snack foods and cereals

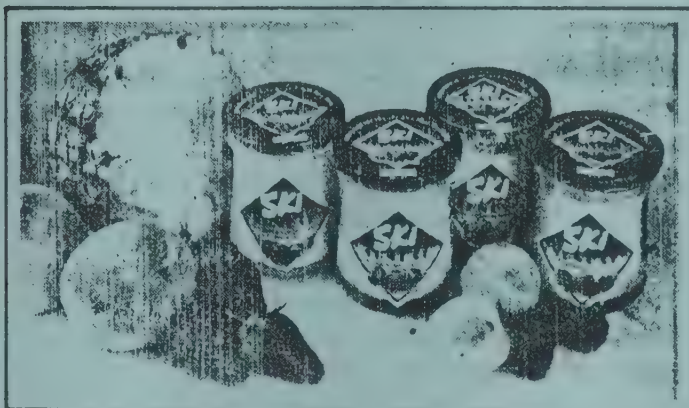
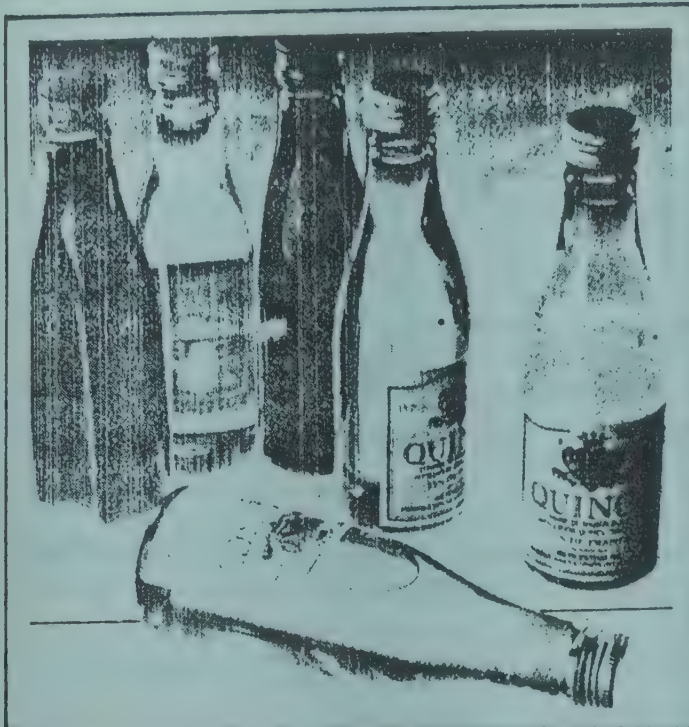
size) have an edge over rigid containers. The reason is that they are lighter and economical. Besides being functional in protecting the contents of a container from moisture, oxygen and loss of aroma, plastic packages can be easily and attractively decorated by multi-colour printing. However, in the selection of plastic materials, complete compatibility studies have to be undertaken to ensure the expected shelf-life of the product as well as safety to the consumer.

Considerable research is being carried out, particularly in the West, in plastics recycling. Processes and equipments have been developed for this purpose. Research and development in the area of totally biodegradable plastics (or 'natural' polymers) is also making good progress. One example is the polymer material called PHB (Polyhydroxy-butyrate) being developed in the UK. (For more on plastics recycling, please see 'The Versatile Plastics: Technology, Development, Application and Waste Recycling', *Tech-Monitor*, January-February 1989).

### THE VERSATILE PET

Polyethylene terephthalate, known widely as 'PET', makes a versatile packaging material. PET first made massive inroads into the beverage packaging market, then the food market, the toiletry and cosmetics and





PET bottles for packaging a range of spirits (top) and PET yoghurt pots (bottom)

even the agrochemical areas. There are many reasons for its success: it is tough, has a clean bright appearance, can be made stable over a wide range of temperatures, light yet provides a good barrier to many gases, and, above all, is suitable for use with a wide range of foodstuffs and beverages.

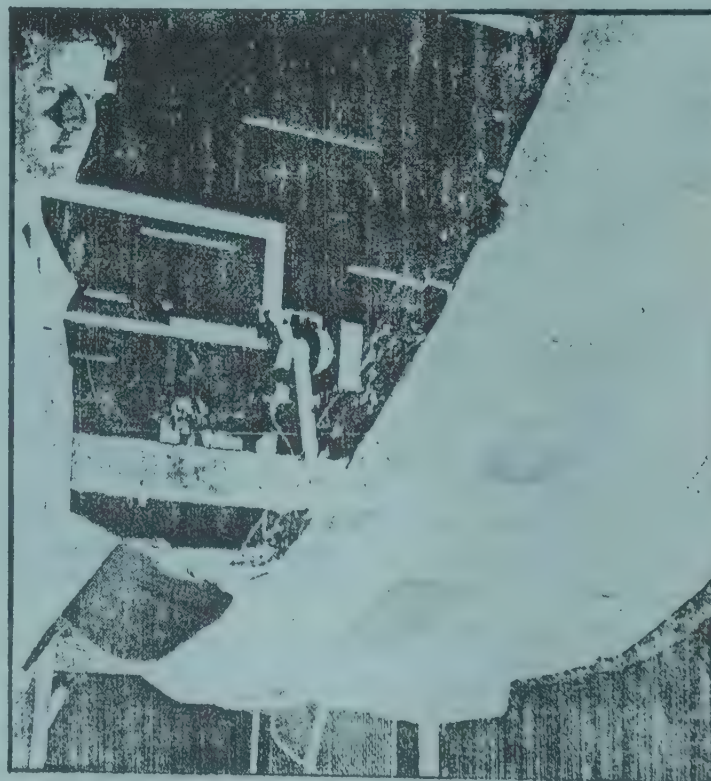
PET has quite a high value as a recyclable material. It can be ground down and used for many things from insulation to strapping material. A company in the Netherlands, for instance, has not only been very successful in the manufacture of PET pre-forms and complete bottles for the home and export markets, but has been one of the first to get an actual recycling scheme going. The intention of the company is to actually produce new bottles. Initially they have been grinding up the material and producing base caps, so eliminating the requirement to remove base caps when their own bottles are returned. As more of their own bottles are returned, or more bottlers adopt free standing PET bottles without base caps, it should be possible for this company to use the returned material for manufacturing new bottles.

However, compared to most packaging materials PET is expensive. Yet, PET usage has increased at a rate which has astounded a great many people, and today manufacturers are constantly revising forecasts for world PET usage, always upwards. Substitution of traditional packaging materials by PET is happening right across the food and beverage range, and the possibilities for PET seem boundless. In many cases manufacturers are ignoring the price disadvantage to make a switch to PET, because the material offers them so much in other ways. It is an exciting material holding a great many possibilities for the packaging market since it is so versatile. While it is best known in its stretch/blown form, the technique used to produce carbonated drink bottles, PET can also be injection-moulded, blow-moulded, extruded and thermoformed.

### THE DUAL-OVENABLE PLASTIC PACKAGES

Plastics entered the dual-ovenable packaging scene with the concurrent development of microwave ovens (requiring non-metallic heat-in packages), and the hotter conventional convection and infrared oven equipment. The challenge for dual-ovenable packages is that they must perform under freezer temperatures as well as in conventional-oven environments of 204°C or more.

Trays made of temperature-resistant plastics, such as thermoset polyesters and CPET (crystallizable polyethylene terephthalate), have more than met the challenge. Some of the major CPET resin manufacturers are working to increase the high temperature stability of CPET. The goal is a 260°C use-environment tolerance, up from the current 204°C to 232°C maximum. The higher heat resistance is designed as insu-



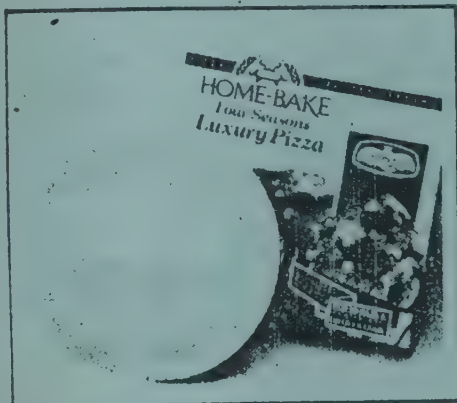
Thermoformed CPET food trays



rance that the CPET tray will remain rigid and not break down in high-temperature conventional ovens, where the package can get hotter than the food. Even though the plastic trays are more costly than the aluminium or coated paper versions, companies using them say there is a definite consumer preference for plastics.

### MODIFIED ATMOSPHERE PACKAGING (MAP)

The shelf-life of foodstuffs is limited by spoilage arising from microbial growth, enzyme activity, oxidation, senescence and staling. The use of gases, other than normal air, to surround the food may retard some of these deteriorative mechanisms. The use of controlled bulk-storage atmospheres is well known for the delaying of senescence and extending storage life of fresh respiring fruits and vegetables.



*Flash-metallized film/board laminates (far left) cause intense heat in microwave ovens, crispen bakery products and PET films coated with PVC barrier layer (near left) have high transparency, bond strength, printability.*

Significant advances have been made in the application of modified atmospheres, where the gas mixture is controlled (Oxygen, Carbon-di-oxide and Nitrogen in various percentages) only at the point of packaging. MAP has led to the development of high-performance barrier films. Fresh meat accounts for over half of MAP film packaging. Meat packed in this way has a long shelf-life, and it retains the natural colour. One disadvantage of the system is that the packs are too bulky. That's because there has to be a space between the meat and the pack: if the meat touches the sealing film, it loses its colour. Some retailers are looking for a skin pack with a 6- to 8-day shelf-life, and with a very high oxygen permeability, to retain the natural colour of the meat. MAP is also bringing fresh fish into super markets, without the need for a special counter, and without the problem of smell spreading through the store. It is also being applied to vegetables; special systems have selective permeability that allows the vegetables to respire.

Advances in the use of aluminium are continuing, particularly in vacuum-metallized plastics film constructions. These films have advantages in barrier properties, in aesthetics, and in microwave absorption properties. Flash metallized films, with very thin layers of aluminium, can have positive advantages in microwave cooking. Receptor boards are polyester films, coated with a 0.003-micron layer of aluminium, and laminated to paper or board. Placed under or over the food in the oven, they generate intense heat sufficient to crispen the product. The aluminium coating is suffi-

ciently thin to prevent arcing. French fries, pizzas, and bakery products are prime target areas.

### CONTROLLED ATMOSPHERE PACKAGING (CAP)

CAP keeps foods naturally fresh instead of protecting them with barriers. The advent of "smart" selectively permeable CAP film packaging systems has begun to expand the concept into broad food areas. Red meats, coffee, grated cheese, and salad vegetables are the first to use packages designed with CAP-specific materials in order to extend product shelf-life. These more-efficient new CAP materials are the forerunners of a host of structures being developed worldwide. Because they are tailored for CAP, they overcome the drawbacks of applying film and sheet developed for other packaging markets in CAP applications.

Until now, most commercial CAP packaging used standard oxygen-barrier film and sheet. CAP-packaged red meat, baked food, and fresh pasta products, for example, currently are wrapped in PVDC- or EVOH-based barrier films. The drawback of barrier films in CAP is limited shelf-life; most foods continue to "breathe" after being packaged, unfavourably altering the balance of CAP gases that have been specifically combined to preserve them. However, CAP-specific materials exchange gases to maintain that balance from the atmosphere (Figure 1). The result: dramatic gains in shelf-life.

### CONCLUSION

Packaging to international standards requires advanced materials, manufacturing, processing and printing technologies. Many Asian countries, therefore, meet their packaging needs through imports. While large foreign joint venture companies have in-house facilities to produce standard packaging requirements, local companies often rely on packaging manufacturers to supply their materials.

The rising number of Asians living and working outside the region since the early 1970's has encouraged a growing market for Asian food in Europe and the Middle East. Food processing companies in some newly industrialized countries have built up sizeable export industries supplying this expatriate market. Since their food manufacturers buy in all their packaging require-



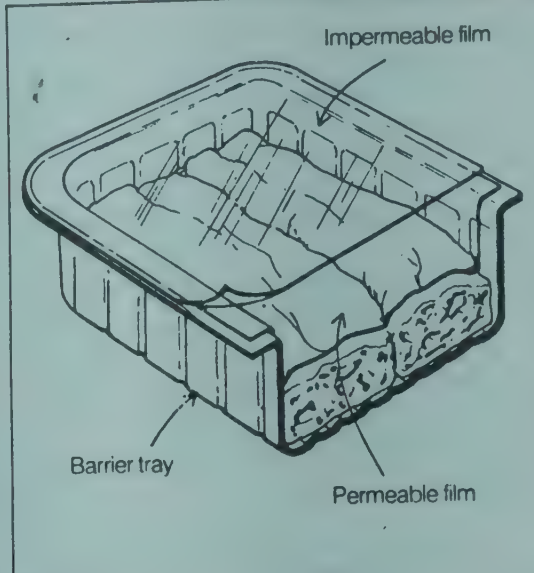
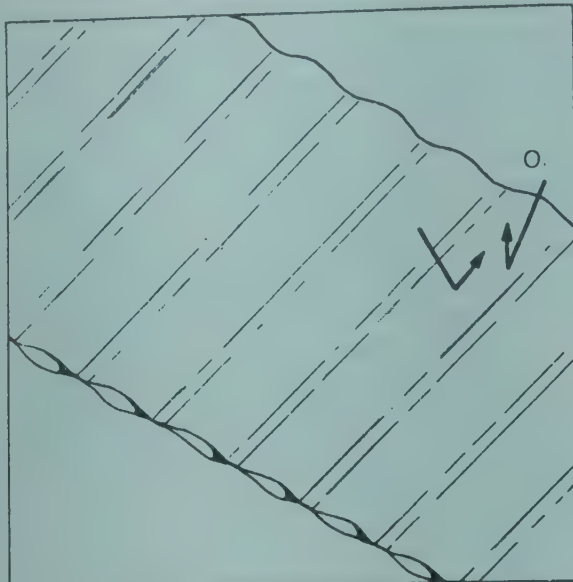


FIG. 1.: CAP: The film systems (far left) passes  $\text{CO}_2$  generated by foods through the inner HDPE film into the exchange chambers formed by strip lamination. The outer polyester film prevents excess oxygen from reaching the contents. The CAP system (near left) for red meats is a tray overlidded with PVDC-based barrier film. When the outer film is removed by the retailer for refrigeration, the meat recovers its red colour through the oxygen-permeable inner polyethylene shrink wrap.

ments, local packaging suppliers have seen their sales volumes increase in line with their countries' growing food export levels. What is more, the printing companies in these countries have modernised faster than those in many other Asian countries, and leading packaging companies there have been quick to develop the even larger food packaging market potential offered by other countries in the region.

The packaging scenario is different elsewhere in the region. Even in countries with a sizeable number of

their own packaging companies, they are finding it difficult to meet internationally accepted packaging standards and substitute imports. The reasons are obvious: the materials used are often not of superior quality and the technologies not quite up-to-date. The packaging companies in the region are, therefore, under increasing pressure to upgrade the quality of their products. The challenge could be met only through appropriate research, development and technology transfer. □

**References:** (1) "OTS Cans - Standardisation and Constraints in Indian Conditions", *Standards India*, October 1987; (2) "Plastics in Packaging", *Standards India*, October 1987; (3) "The Potential of PET", *Food Manufacture*, September 1986; (4) "What's the Outlook for Dual-Ovenables?", *Modern Plastics International*, September 1986; (5) "Food Packaging brings out the Best in High Performance Films", *Modern Plastics International*, February 1988; (6) "New Methods of Preservation", *Food Manufacture*, July 1987; (7) "Smart Films give a Big Lift to Controlled Atmosphere Packaging", *Modern Plastics International*, September 1986; and (8) "Presentation is Everything", *Far Eastern Agriculture*, November-December, 1987.

(Reprinted from Asia Pacific Tech. Monitor, March-April 1989)

## RAW MATERIALS

### 71 Amaranth as a potential food grain

The leaves of amaranth are an excellent source of carotenes and they have higher protein content than cereal grains. From nutritional point of view also amaranth contains more protein and fats than cereals. The high protein quality in amaranth is due to its higher lysine (an amino acid) content. Processing techniques, such as flaking, light roasting, popping, wet cooking and extrusion, increase protein quality of amaranth grain. The whole grain as a food source merits greater attention, particularly as a weaning food, because of its excellent protein quality and relatively high energy content. Although digestibility of amaranth oil is lower than cotton seed oil, it is not toxic. Thermal processing of the liquid free amaranth has shown significant improvement in animal feeds.

Amaranth can be used alone or in mixtures. When alone, after cleaning, dry grain can be processed to be popped or expanded and if wetted to form flakes. Dry grain can also be extruded alone or mixed with other products such as soyabeans, to give extruded flours. Grains when subjected to starch hydrolysis give a soluble product which is ideal for feeding children.

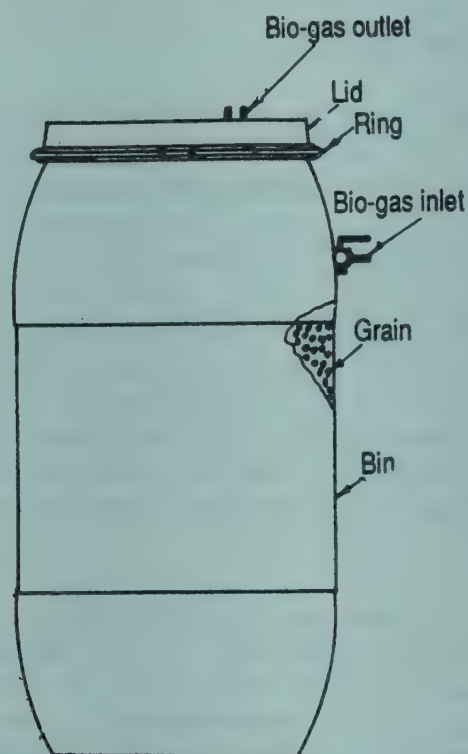
In mixtures, processed flour can be used as such or mixed with other nutrient sources such as maize, rice or wheat. Complimentary effect of protein was observed when mixed with maize. Amaranth can also be used for animal feeds. The use of by-products from grain harvest is also of interest. Stems and leaves can be fed to ruminants. Grain calyx, after roasting, can be added to poultry feeds. A good silage has been produced from the inflorescence.  
(Documentation Bulletin No.76, 1989, 13-14)



## STORAGE AND INFESTATION CONTROL

## 272 Grain storage bin

A leak proof PVC grain storage bin with a capacity of one quintal has been developed at the Tamil Nadu Agricultural University, Coimbatore with the objective of using biogas as a fumigant for stored grain pests of paddy, sorghum and turmeric.



The bin is rectangular shaped with a circular mouth. It has a removable lid and ring. The lid's gasket arrangements checks the leakage of biogas. The inlet gate valve ensures 75 per cent space for grains and the balance for biogas. The bin costs about Rs. 250/-

For more details contact: S.Mohan, P.T. Palaniswamy and Dr.M.Balasubramaniam, PHT Scheme, CAE, TNAU, Coimbatore-641003. (The Hindu 15 November 1989, 24)

## 273 Storage loss in garlic

Garlic (*Allium sativum*) is an important spice crop used for flavouring dishes. Storage losses are greater in onion and garlic to study the effect of nitrogen, phosphorus and potassium fertilization on storage loss of garlic research was done during Kharif at the UAS, Dharward. Three levels each of nitrogen (100 and 200 kg/ha) phosphorus (50 and 100 kg) and potassium (50 and 100 kg) were included. The percentage loss of moisture in bulbs was recorded by keeping 1000 g of bulbs per treatment in a perforated bag at room temperature.

Normally, garlic storage is a problem due to loss of moisture and spoilage of cloves. It was observed that the percentage loss in weight in garlic bulbs was more when nitrogen was applied. Greater nitrogen application means more bulbs but it lowers storage quality while phosphorus and potassium improve it.

Increasing the level of phosphorus also increases moisture loss, as a result of greater dry matter accumulation, as is the case with increased level of potash which improves storage quality. The application of phosphorus and potash with nitrogen decreases the adverse effect of nitrogen storage.

For details contact: B. Sampath Kumar Setty and Dr. G. S. Sulikeri, University of Agricultural Sciences, Dharwad - 580 005.  
(The Hindu 15 November 1989, 24)

#### 274 Food-biocide for increased shelf-life

Raw fruits, vegetables, fish, sea-foods, meat poultry, etc are mostly contaminated with pathogenic micro-organisms, which not only make them unhygienic for human consumption, but also limits their shelf-life because they become unpalatable and foul smelling after certain time on storage, due to the deterioration in their natural taste and flavour. An extremely powerful biocide, Aquarine liquid, destroys these micro-organisms, including bacteria, viruses, moulds, fungus, algae, yeast, etc. effectively and economically. Aquarine also reacts with the putrid organic waste matters and destroys the foul odours. It controls the growth of micro-organisms, which promotes fermentation and putrefaction. Moreover, it destroys the unwanted blood-urea from the sea-foods. The raw foods, when properly treated by Aquarine remain fresh palatable for much longer period and have thus, longer shelf-life. Aquarine is equally useful as effective disinfectant for sterilising and deodorising the plant, equipment, containers, drainage, floor, water, etc.

For more details write to: Surfochem Industries, 3 Nilkanth Sadan, Peru Bagh, Aurey Road, Goregaon (East), Bombay - 400 063.  
(Chemical Products Finder 8(4), 1989, 26)

#### 275 Milk coating for fruits

Attila Pavlath of the US Department of Agriculture Research Service, Albany, California has found a way to keep sliced fruits and vegetables fresh for up to three days by covering them with an edible milk-based coating. If the technique is developed further, it may preserve food for several weeks, rendering items such as frozen pizza and other convenience foods obsolete.



Pavlath claims that this is the first time a way has been found to preserve fruits and vegetables that have been cut or peeled. The problem had been to find a coating that enables carbon dioxide to pass through it, so that the taste of the food would not change. It has to stick on to a moist surface and prevent oxygen passing in and water passing out. The coating has also to be edible and acceptable to the US Food and Drug Administration

Pavlath found a solution in milk protein which is capable of forming a very good film, and provides a barrier against water and oxygen when enzymes are added to the milk. According to him, these films can also be used to modify and produce exciting new flavours and colourings to standard food.

(Business World 9(11), 1989, 51)

## 276 Controlling a pest of redgram

Redgram, an important pulse crop, suffers huge losses both in the field and in store due to insect pests. Bruchids constitute a major threat as they multiply rapidly and cause extensive damage to the produce in store. Though chemical methods help in protection, they cannot be used because of the adverse effects produced such as residual toxicity, contamination and application hazards.

Insecticides of plant origin, are in contrast, more effective. Certain vegetable oils, plant products and inert dusts are considered cheap and effective grain protectants against pulse beetle.

In an experiment conducted to study control measures, neem oil, groundnut oil, sesame oil, sunflower oil, mustard oil, neem leaves, sweet flag, neem cake powder, red earth and cowdung ash were tested for 90 days in storage of red gram (ST-1). Of these, neem oil, groundnut oil, mustard oil, sesame oil and sunflower oil at 0.3 to 0.5 per cent concentrations (V/W), red earth (15.0 to 20.0 per cent), sweet flag (1.5 to 2.5 per cent), and neem leaves at two per cent concentrations (W/W) showed positive results. There was absolutely no infestation during the 90-day-period in store. Neem cake powder and cow-dung ash were found the least effective.

For details contact: Dr.K.Padmavathamma and Dr.P.Kameswara Rao, APAU, Tirupati-517502.  
(The Hindu 1 November 1989, 24)

## 277 The dream of obtaining "environmentally-friendly" pest control

The dream of obtaining "environmentally-friendly" pest control agent which is harmless to man and small mammals and yet combats insect pests has been realised by a team of organic chemists at London's Imperial College of Science and Technology.

This follows work by Dr. David Morgan of Keele University who initially isolated the potent insecticidal compound, azadirachtin, from the tropical neem tree (*Azadirachta indica*) which is widespread throughout Southeast Asia and Africa and commonly exploited in local folk medicine. This tree produces azadirachtin as a natural defence against insects.

The natural chemical kills insects, including *Locusta migratoria*, by suppressing appetite, disrupting growth and upsetting mating. Scientists have observed no mammalian toxicity with azadirachtin, the compound does not accumulate in the food chain and it is readily degraded in the environment.  
(The Hindu 1 November 1989, 24)

## FOOD ADDITIVES

-Nil-

## PROCESSES

### 278 Rice bran oil and cholesterol

A new "health oil" is looming on the horizon, which is not only claimed to be the best known yet for lowering blood cholesterol levels, but also accelerates growth, and promotes the health of the skin.

Extensive studies on rice bran oil and its various fractions at the National Institute of Nutrition (NIN), Hyderabad, and at the Central Food Technological Research Institute (CFTRI), Mysore, have shown that rice bran oil may have a better cholesterol lowering effect than any other vegetable oil.

The studies have shown that the composition of rice bran oil is very close to that of groundnut oil. Both the oils contain about 35% linoleic acid, an essential fatty acid, known to bring down the cholesterol level in the serum and liver. Further, rice bran oil possesses the highest hypocholesteremic property compared to other edible oils like safflower oil, sunflower oil, cottonseed oil, soyabean oil, sesame oil, corn oil and groundnut oil. Scientists of NIN claim that rice bran oil is even better than safflower oil - until now known as the best vegetable oil for lowering serum cholesterol.

A blend of rice bran oil and safflower oil, in the ratio of 7:3 is more effective because of the combination of high linoleic acid in safflower oil and unsaponifiable fraction of the rice bran oil, according to NIN studies.



Apart from this, rice bran oil has some other advantages. The oil contains high levels of tocopherols (Vitamin E) which confer stability against oxidation to the oil. Rice bran oil is also known to decelerate ageing in human beings. It is good for maintaining the integrity of the skin and, the keeping quality of the oil is also high when compared to other oils. Foods, deep-fried in rice bran oil, absorb less oil compared with foods fried in groundnut oil.

Investigations at CFTRI, have shown that oryzanol, a compound isolated from the soap stock obtained during alkali refining of rice bran oil, is responsible for lowering cholesterol. At 0.5 per cent concentration oryzanol can significantly lower serum and liver cholesterol and serum triglyceride levels in rats fed with high-cholesterol diet.

Oryzanol possesses a higher degree of cholesterol-lowering potency than curcumin or turmeric and capsaicin of red chillies. Further, it also inhibits platelet aggregation (clustering into a mass) in blood in experimental animals. High cholesterol and triglyceride levels in blood leads to atherosclerosis and associated coronary problems. This is further aggravated by the aggregation of platelets. Since oryzanol is potentially active against all these three factors, its usefulness needs to be emphasised.

Oryzanol is a mixture of some compounds such as ferulic acid esters of campesterol and B-sitosterol. In addition to its hypocholesterolemic activity, oryzanol has many possible pharmacological uses like acceleration of growth, regulation of oestrous cycle and ability to promote skin capillary circulation as demonstrated in experimental animals. Oryzanol is also reported to have anti-itching and anti-dandruff action. It is also considered to be a good antioxidant for oils and fats. Thus, rice bran oil is endowed with many unique beneficial qualities and one may brand the oil as 'health oil' and boost its popularity.

India is emerging as a leading producer of rice bran oil in the world with an annual production at 330,000 tonnes in the financial year 1988-89, comprising 135,000 tonnes edible grade oil and 195,000 tonnes of industrial grade oil. However, to reduce the dependence on imported edible oils, the vast potential of rice bran oil has to be fully exploited. One of the major problems in producing good-quality edible-grade rice bran and oil is the presence of lipase enzyme in rice bran which causes rancidity and makes both the oil and bran unfit for human consumption. Appropriate technologies developed by CFTRI, Mysore and other organisations for effective stabilisation of rice bran would help boost production of edible grade oil in the country.  
(Chemical Weekly 35(7), 1989, 91-92)

## 279 Cholesterol and rice bran

Use of rice bran as food ingredient may find new popularity if ongoing research confirms that it is effective in reducing cholesterol levels in humans.

Preliminary results of studies conducted at the Western Regional Research Laboratory of the Agricultural Research Service, U.S. Department of Agriculture, suggest that rice bran is beneficial in lowering cholesterol.

"Rice bran definitely lowers cholesterol in laboratory animals", said Dr. Robin Saunders, research leader of food quality at the Albany, California, laboratory. "Preliminary reports from human studies in Australia support these lab results. It certainly appears that stabilized or parboiled rice bran produces the same effect as oat bran".

Preliminary results from the research showed that a balanced diet including 10% dietary fibre from rice bran reduced cholesterol in the laboratory animals by more than 15%.

The technology developed by A.R.S. to preserve the freshness and extend the shelf life of rice bran is instrumental in the product's growing use in food. In the process, bran that has been milled off the rice kernel is run through an extruder, which deactivates enzymes and stabilizes the bran.

"Tests are under way to determine if feeding rice bran to poultry will lower the cholesterol level in eggs," he noted. Results of that study are expected later this year.  
(SEA News Circular 3(8), 1989, 8-9)

## 280 Cheaper vanaspati

Dr. R. Rank, an eminent Indian molecular scientist, has developed a system to produce vanaspati in half the time than what is usually taken at present by vanaspati plants. The system is called R-Index hydrogenation system. Vanaspati produced by this system is said to be more hygienic. Dr. Rank demonstrated this system in plant scale at the Government Vanaspati Factory, Guwahati, and in a reputed vanaspati factory at Rajkot, in the recent past.

Further information can be had from: Dr. R. Rank, DBC312, Jolly Bhavan 2, 7 New Marine Lines, Churchgate, Bombay 400 020.  
(Chemical Products Finder 8(3), 1989, 126)

## 281 Frozen milk

U.S. researchers have developed concentrated milk that's low in fat, free of cholesterol and can be stored in freezers, perhaps making unnecessary large plastic jugs that clog refrigerators. "What we've done is to remove the milk fat, and replaced it with oil - corn oil, peanut oil, soyabean oil or whatever," said George Bookwalter, a scientist at the Federal Northern Regional Research Centre here. The newly patented process could greatly expand milk markets and provide new convenience to milk drinkers.  
(Deccan Herald 9 November 1989, 10)



## BY-PRODUCTS AND WASTE UTILISATION

### 282 Vegetable wastes utilization

Specialists at the USSR Academy of Sciences and the Combustible Minerals Research Institute have developed a method to obtain petrol and diesel fuel from vegetable wastes. Professor Albert Lapidus, head of the research team, said, "Agricultural and timber waste, as well as kitchen garbage are first turned into gas by means of a special catalyser. This gas is turned into liquid fuel. It is in no way inferior to petroleum fuel as regards energy output". He said they were now developing a prototype of a mobile installation to produce fuel in distant and forbidding areas which are rich in timber and other wastes.

(Deccan Herald 30 November 1989, 10)

## PROCESSED PRODUCTS

-Nil-

## EQUIPMENT AND MACHINERY

### 283 Carton sealing machine

The 3AM Econopack automatic taping machine from ITW-Signode can apply BOPP or rigid PVC pressure sensitive sealing tape on the top and bottom of cartons simultaneously. Being a twin mast design and having a top and bottom positive belt drive, full closure of flaps is ensured. Specially designed machines are also offered for non-standard applications. The carton sealing machine is ideally suited for high speed, effective sealing of centre meeting cartons in industries like food processing, drug and pharmaceutical, breweries and distilleries, engineering, soap and detergents, aluminium foils, man-made fibre, electronics, etc. Econopack is backed by Nagarjuna Signode's servicing personnel and total spares availability.

For more details write to: Nagarjuna Signode Ltd., Nagarjuna Hills, Panjagutta, Post Box 1520, Hyderabad, Andhra Pradesh 500 482. (Chemical Products Finder 8(5), 1989, 132)

**284 Filling and sealing machine**

Khosla Engineers offers the Finseal-11, a horizontal form filling and sealing machine that can pack a variety of products like biscuits, confectionery, buns, soap cakes, auto spares and stationery items in pillow shaped packs. It uses BOPP, polyester films and laminates as wrapping materials. The machine is well engineered for ease of maintenance, reliable operation and size changeability. Option of print registration is also available.

For more details write to: Khosla Engineers, 644 Sector 16, Chandigarh 160 015.  
(Chemical Products Finder 8(5), 1989, 90)

**285 Powder filling machine**

A powder filling machine with a variable speed auger, for greater flexibility of fill and with greater power for more accuracy, has been developed in Britain. The Model 6000 also has a heavy duty clutch and brake which transmits more power to the auger, allowing heavy products to be filled with ease. It also gives optimum stopping repeatability for the greater accuracy possible. The machine is fitted with quick release guarding for safe separation and ease of maintenance and all product contact parts are manufactured from 316 stainless steel as standard, making it suitable for aggressive products and pharmaceuticals. The unit has easy to operate touch controls and a robust construction and is supplied with a wide range of optional extras. There are minimal maintenance requirements and no special tools needed. The agitator clutch drive offers the options of having the agitation in drive constantly or intermittently with the auger, or being shut off completely. Uses are in food, chemical and pharmaceutical industries.

For further information write to: Tri-Tech Systems Ltd., Unit 9, Cliffe Industrial estate, South Street, Lewes, East Sussex BN86JL, U.K.  
(Industrial Products Finder 17(11), 1989, 125)

**286 Rotary type cup filling machine**

Panpack Marketing offers an automatic rotary type cup filling machine for use in food and pharmaceutical industries. It can handle plastic cups of different sizes and shapes. The machine is ideally suited for filling ice cream and can also be used for jam, honey, oil, margarine, yoghurt, fruit juice, soft drinks and cream.

For further information write to: Panpack Marketing, P.B.No. 48, Panchal House, Near Municipality Office, Anand, Gujarat 388001.  
(Industrial Products Finder 17(11), 1989, 52)



## 287 Automated sandwich maker

Equipment for sandwich production with automatic and accurate deposition of the filling and cutting has been developed in Britain. The Automatic Sandwich Line from Bryant offers clean, rapid, continuous and accurate production of sandwiches under computer control. The single line has a throughput of up to 1,200 sandwiches per hour (throughputs of up to 2,300 and 3,600 per hour can be achieved with 2- and 4-track models, respectively). Single, double and triple deck sandwiches can be made, and cutting is neat and free of smears. Slices of buttered bread are placed automatically, or by hand, on a moving belt within a V square formed by two ridges. Pumpable fillings are deposited automatically and accurately. The weight of these can be controlled down to 6 g. Fillings may be changed without stopping the machine. Waste is reduced considerably because the depositors do not operate if the bread is missing from the line. Operation is clean and hygienic and the equipment is made from food quality stainless steel. The equipment can be customised to suit the requirements of individual caterers.

For further information write to: Bryant Ltd., Belam House, Wycombe Road, Stockenchurch, Buckinghamshire HP14 3RR, U.K.  
(Industrial Products Finder 17(11), 1989, 63)

## 288 Doughnut machine

The SS1200 A Donut Machine entertains customers as it operates, with flashing lights, warbling sound, tiny rocking astronaut, and whirling logo disk. Just 93,98 cm long, the machine produces 1,200 mini doughnuts/hour. Normal profit to the operator is said to be 85% of sales. Other models allow faster production and bigger doughnuts.

For further information write to: Lil' Orbits, Inc. 8851 Research Center, Minneapolis, Minnesota 55428, U.S.A.  
(Industrial Products Finder 17(10), 1989, 115)

## 289 Biscuit stacking machine

This machine automatically aligns biscuits coming out from cooling conveyors for final packing, without breaking or damaging the biscuits. It can contribute to considerable saving in labour and time in biscuit manufacturing plants. The machine can handle many shapes and sizes of biscuits and setting can be easily done as per batch requirements. The unit is designed for various speed requirements which can be selected by a V belt driven variable pulley, available in various sizes ranging from 1.5 ft to 2.75 ft.

For further information write to: Soni Engineering Works, Subhash Nagar, Near Kali Mata Mandir, Follower Lane, Ambernath Road, Ulhasnagar, Maharashtra 421 0903.  
(Industrial Products Finder 17(10), 1989, 130)



## 290 Heavy duty kneading machine

FE manufactures heavy duty Sigma Kneading Machine which is specially designed for mixing, masticating, breaking down, dispersing, wetting down and homogenising viscous materials of the strongest consistency used in the chemical, dyestuff, food, paint, and adhesives industries. The kneading blades are casted in one piece and is of duplex type so as to avoid any dead spots which on other blade types accumulate unwetted solids and cause non-uniformity of product. Both blades rotate in opposite direction towards one another and in different speeds having ratio 1:2 or any ratio that the user requires so as to ensure intensive lifting and homogenising of the material. Heavy stuffing boxes are provided with roller bearings, phosphor bronze bushing and Teflon impregnated seals to ensure smooth working and longer life of machine. The entire container can be tilted from horizontal to vertical position up to an angle of 110° manually, electrically, or hydraulically as desired. Bottom discharge can also be provided to facilitate quick discharge. Vacuum and Jacket arrangement is also provided to suit requirements. The machine is available in capacity ranging from 6 to 1,000 kg in SS and MS construction.

For more details write to: Frigmair's Engineers, Bharat House, 2nd Floor, 104 Bombay Samachar Marg, Fort, Bombay 400 023.  
(Chemical Products Finder 8(5), 1989, 130)

## 291 Bottle washing compound

Indo Fluorine's Synflow is a very useful liquid cleaning formulation and an economical substitute for conventional caustic washing compounds used for bottle washing and tank cleaning. Use of 3.5% of Synflow in washing solutions can effectively clean tanks and bottles to remove adhering dirt, mould and other impurities. The compound is water soluble and can be rinsed easily. It does not form scales or corrode the bottle washing machinery and is safe to handle. The applications of Synflow are for bottle washing in milk dairies, breweries, soft drinks and wash cleaning of tanks vessels, tankers and empty drums.

For more details write to: Halberd Marketing, 14 Prasad Chambers, Opera House, Bombay 400 004.  
(Chemical Products Finder 8(5), 1989, 127)

## 292 Filters for wineries

Pall Process Filtration Ltd, UK offers a wide range of filters for the clarification and microbiological stabilisation of all types of wine, without the introduction of any undesirable characteristics. Fibres, particulates and micro-organisms are removed without disturbing unique and often delicate qualities of taste, colour and bouquet that characterise a wine. Over the last few years, the company has devoted a great deal of attention to the highly critical terminal filtration stage, and bottling can now be carried out with greater confidence and cost-efficiency. To make both production and filtration more economical, however, it is necessary to make improvements



throughout the process with more effective contamination control in the prefiltration stage. With this in mind, Pall has developed cartridge filters that provide the industry with cost-effective and reliable filtration. This 'total' approach offers the wine bottler several important benefits viz filtration of a consistent and defined quality; high volume throughput; and more economical filtration.

For more details write to: Filtech Pharmalab Pvt Ltd., Star Metal Compound, LBS Marg, Vikhroli (West), Bombay 400 083.  
(Chemical Products Finder 8(5), 1989, 9)

## 293 Filters for breweries

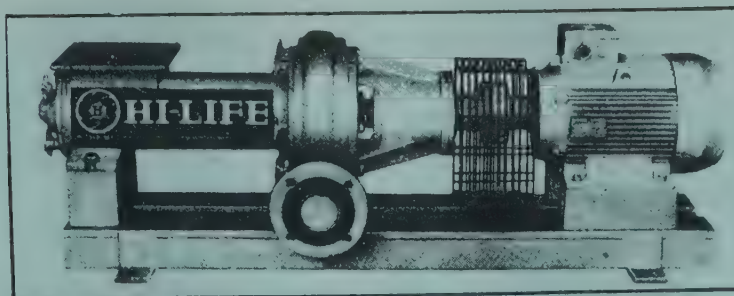
Pall Process Filtration Ltd, UK offers quality filters to the brewing industries. Reliable performance, space savings, hygiene, simplicity of use are a few of the salient features. Savings in capital outlay, labour costs, energy consumption and down time improve the process economies. The filter cartridges offered are designed for secured sealing and rapid change-overs. They can be repeatedly steam sterilised and cleaned in situ for a longer service life. These cartridges are made from Nylon 66, glass fibre or polypropylene media for liquid applications. For air or gas filtration pure cellulose or PTFE media can be offered. SS filter media are also available. Housings required for the cartridges are manufactured in India under advise of Pall, UK, SS 316L construction with compact, leak proof design is offered for maximum hygiene.

For more details write to: Filtech Pharmalab Pvt Ltd., Star Metal Compound, LBS Marg, Vikhroli (West), Bombay 400 083.  
(Chemical Products Finder 8(5), 1989, 18)

## 294 Crushing pump for food industries

This is a centrifugal pump whose suction branch is replaced by a blade. The product, by Archimedian screw to centrifugal impeller, during the distance is sufficiently crushed under certain conditions. The product on coming out can be quite as pulp. The pump is used in food industries, especially to handle residues of fruit, vegetable and fish, particularly in tomato treatment if previously scalded.

This pump can transfer the peeling discards directly to the pre-heater without going through the crushing. While the pump casing, impeller, Archimedian screw and cover come in gun metal, the crushing casing, shaft, stuffing box in SS 304 or SS 316. To have an easy dismantling for cleaning, all main parts are fixed by wing nuts.



For more details write to: Hi-life Manufacturing Co, PO Box 43, GIDC Estate, Vatva, Ahmedabad, Gujarat 382 445.  
(Chemical Products Finder B(5), 1989, 12)

## 295 Mixers and blenders

Alpen Mixers and applications in the drug, pharmaceutical, food, paint pigment, dyes and chemical segments of the process industry. They are suitable for liquid-liquid, solid-liquid, and solid-solid mixing. A wide range of models is offered to choose from: stationary tank mixers, ribbon blenders, rotary double-cone blenders, rotary twin shell blenders, Nauta mixers, Sigma mixers/kneaders, and planetary or change-can mixers. Materials of construction include carbon steel, stainless steel (AISI 304, 304 L, 316, 316 L), Inconel 600 and Monel, Jacketing for heating/cooling, where required, can be provided. Lump-breaking arrangement is incorporated where hygroscopic or lump-forming materials are handled. Manual or mechanised tilting arrangement is offered where top discharge is required, the latter with inching mechanism.

For further information write to: Alpha Process Engineers, 102 Savera A, J P Road, Andheri (W), Bombay 400 061.  
(Industrial Products Finder 17(11), 1989, 157)

## 296 Aseptic packaging system

Central India Packaging offers the Bowater aseptic liquid packaging machines and bags. Aseptic packaging is suitable for low and high acid products eliminating processing contamination and allowing transportation and storage at ambient temperatures. Various types of products such as juices, ketchups, pastes and concentrates of fruits and vegetables, milk and milk products, etc can be packed and stored at ambient temperatures for long time. Pack sizes range from 3 to 250 litres all of which can be filled on the same machine with minor adjustments. The bags, in turn, are packed into corrugated boxes, 200 litre steel drums, plastic barrels, etc. Various sizes of filling machines are available for packing from 1,000 to 6,000 litres per hour. Fully automatic machines with higher filling capacity are also available. Various types of models to operate on a unit basis or part of an integrated automatic filling lines can be supplied. Standard sterilants can be used for cleaning the machine.

For more details write to: Central India Packaging Company Pvt



Ltd., 3-6-140/2, Liberty Road, Himayatnagar, Hyderabad, Andhra Pradesh 500 029.  
(Chemical Products Finder 8(3), 1989, 98)

## 297 A versatile solar dryer

A simple, foldable solar dryer has been designed and fabricated by Food Technology and Enzyme Engineering Division of BARC for the preparation of raisin from grapes. This dryer will be very useful for small farmers. Production of grapes in India is increasing, and farmers depend mostly on sun-drying to preserve this seasonal and perishable commodity. Sun-drying in the open has got its limitations and inherent problems. The foldable solar dryer, with a capacity of 20 kg of grapes, can bring down the moisture content to 16% in 4 days. Experimental runs carried out at BARC have indicated that both the volume and moisture content of grapes decrease by a factor of about 5 during this period. It can be easily fabricated using commonly available materials. The cost of the unit will be less than Rs.2,000, and will decrease on mass production. Quality of the raisin prepared by using the solar dryer was found to be good even after five months storage at normal temperature. This dryer is versatile, and can be used for drying of extruded products, papads, green pepper etc. with equal efficiency.  
(BARC Newsletter No.69, August 1989)

## 298 Seraphin Poha Machine

The machine is manufactured in India with technical collaboration of Seraphin Engineering Works. This is beneficial and most handy in working and out put by the Poha manufacturers. It is driven by V.belt, with motor suitably attached to main frame of 7.5 H.P./3 Phase/960 R.P.M. Totally enclosed; heavy duty double ball bearing in cast iron, dustfree housing; smooth working with least vibratory noise; Rare break down of main verticle shaft and least repairs; Saving in power consumption more than 10%. Capacity: 8 to 10 Qtls. (per diam i.e. 8 hours). Machine requires ordinary semi skilled labour for Poha processing; roasting operation is separate which requires semi skilled labour. Space: 5'x3' Total working space with machine 10' x 6' minimum.

For further information write to: Spark Electric Works, Agrasen Marg, Behind Police Station, Gondia - 441 601.  
(Documentation Bulletin No.76, 1989, 14)

## 299 Soyabean dehuller

With 18-20% oil and about 40% protein soybean is a doubly advantageous leguminous crop. It is used for making various edible products. Removal of hulls and making split pulses are the prerequisite for further processing of soybean, because the hulls being cellulosic are undesirable in diets.

The dehuller consists of two concentric cylinders, a clearance adjusting mechanism, a V-belt pulley drive mechanism, an exhaust fan just below the outlet of the outer cylinder, a perforated deflector and an electrical motor. The inner and outer cylinders were made of plain mild steel sheets of 10 gauge thickness.

A 10 mm clearance in the neighbourhood of the inlet and 6-7 mm clearance in the neighbourhood of the exist can be adjusted with the help of an adjusting screw. However, any desired clearance below this value can also be maintained with this screw. Dents are made all along the outer surface of the inner cylinders while both surfaces of the outer cylinder are plane.

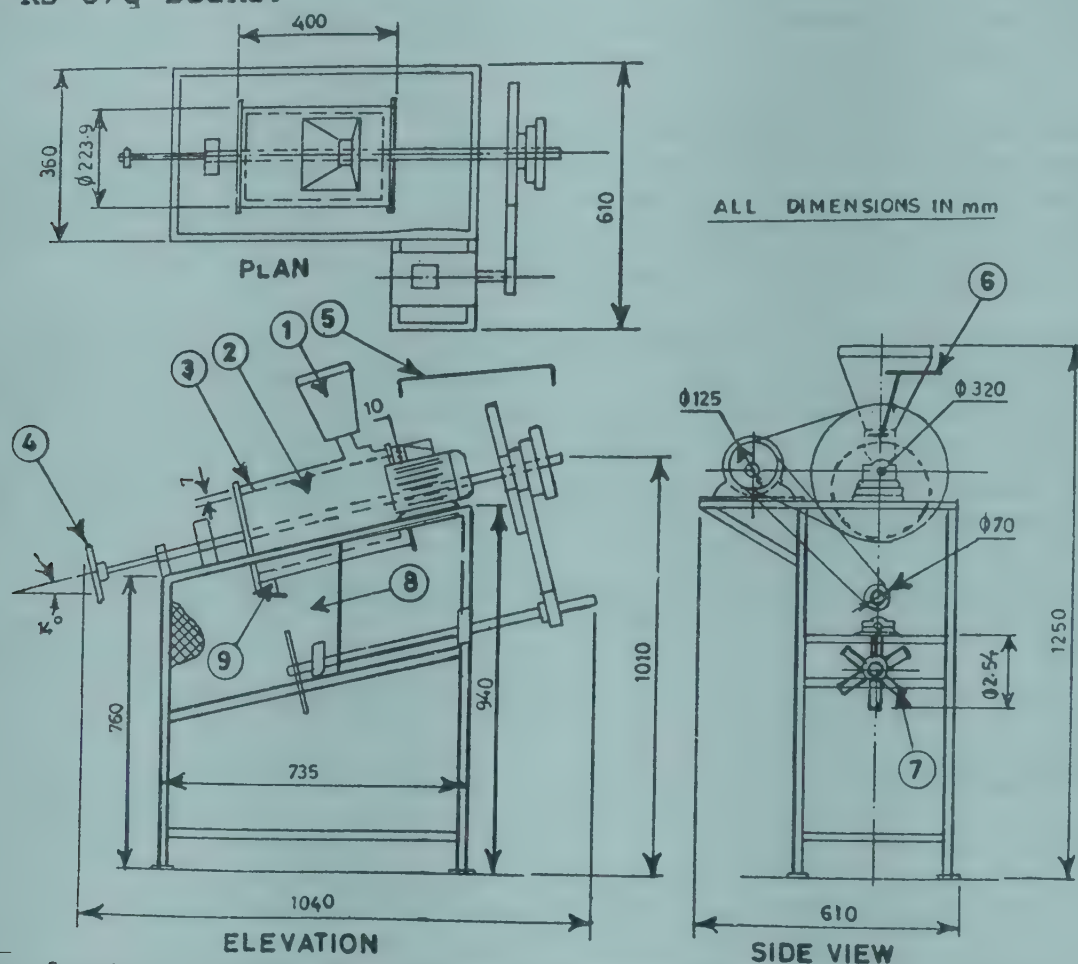
The developed dehuller has following specifications:

Overall length	: 1060.00 mm
Overall width	: 610.00 mm
Overall height	: 1250.00 mm
Dia. of inner cylinder	: 215.90 mm
Dia. of outer cylinder	: 225.90 mm
Length of inner cylinder	: 375.00 mm
Length of outer cylinder	: 400.00 mm
Dia. of exhaust fan	: 250.00 mm
Power requirement	: 1 hp
Speed of inner cylinder	: 450 rpm

About five quintals of soybean was dehulled on this machine. It was found to work quite satisfactorily. It has about 96 kg/hr capacity with about 3-4% breakens. The dehulling efficiency was found to be about 95%.



The cost of the dehuller was worked out to Rs. 3,000. Its expected life and annual use was assumed as 10 years and 300 days, respectively. One unskilled labour is required for its operation. Considering a combination of factors the cost of dehulling was computed to Rs 3/q beans.



The design of the dehuller is simple, and it could be fabricated in any moderately equipped workshop. It does dehulling, splitting and separation of hulls and broken in a single run. It can be operated by an unskilled person. Split dals obtained are free from admixtures.

(Invention Intelligence November 1989, 518-519)

## PACKAGING

### 300 Aspartame packages

The Ministry of Health and Family Welfare proposes to amend the statutory labelling on aspartame packages, reviving the prospect of indigenous manufacture of this billion dollar turnover low calorie sugar substitute.

Aspartame (a discovery of GD Searle of the US) is now being imported and marketed by companies like Cadila. A synthetic protein, aspartame is 180-200 times sweeter than ordinary sugar (sucrose). Since one has to use a small quantity of aspartame to achieve the

sweetening effect of sugar, it is a boon to calorie watchers and diabetics. One gram of sugar contains four calories compared to 0.4 calorie in aspartame.

The Indian affiliate of GD Searle, Searle (India) Ltd., has been unable to implement a letter of intent to manufacture aspartame because the notification on labelling virtually makes the product a prescription drug. Nowhere in the world is aspartame sold as a drug and GD Searle does not want the Indian firm to market its product as such.

The Department of Health notification of April 15, 1988, requires every package of aspartame marketed as sweetener to carry the following warning, "1. for diabetics only, 2 to be used on medical advice, 3. not to be used by pregnant women, children or others having symptoms of phenyl ketonuria". Unlike in the West, aspartame cannot be marketed as powder in dry mixes or in liquid systems in India.

Worldwide, the only warning incorporated on aspartame packages is the one regarding phenyl ketonuria (PKU). This is because PKU patients cannot break down phenylalanine, an essential amino acid required by the body for protein synthesis. PKU patients are also advised to restrict foods like skimmed milk which contains six times, more phenylalanine than an equal volume of aspartame-sweetened beverage. Incidentally, only one in 30,000 in the West suffer from PKU. In India, only one in 60,000 has the disease, according to a study.

Except for the PKU restriction, all other restrictions are unwarranted, according to the company's representation to the Government. This is supported by a large number of scientific studies on the safety of aspartame consumption during pregnancy. The company has forwarded relevant extracts from scientific journals to the Central Committee of Food Standards (CCFS).

It is not known what are the labelling changes being recommended by CCFS. A Gujarat company has been advertising aspartame without incorporating the statutory warning, without inviting any punitive action. Multinationals have often been criticised for double standards in marketing their products in home territory and in the Third World.

This is a novel case of a multinational being forced to adopt a different standard only for Indian market.  
(Chemical Weekly 45(4), 1989, 45)



## ANALYSIS

## 301 Monitoring of glucose in fermentation processes by commercial glucose analyzer

A commercial glucose analyser originally designed for monitoring of blood glucose has been successfully employed in fermentation processes in industry for monitoring glucose. The system operates in such a way that the measured value is updated every 90 sec. The measuring range of the system is 0-5 g glucose/litre and the accuracy is  $\pm 7\%$ .

The response time was found to be approximately 6 min. The system was employed to follow fermentations with two different microorganisms, namely *Saccharomyces cerevisiae* and *Escherichia coli* in media containing upto 5 g/litre of glucose. The performance was fully satisfactory and the values had a very good correlation with off-line analyses.

(Appl. Microbiol Biotechnol 28(1), 1988, 32-36)

## 302 Technique to detect Food Irradiation

Researchers at the Scottish Universities Research and Reactor Centre, have developed a new technique to detect food irradiation.

The test, relying on thermoluminescence (TL) of tiny mineral particles on the food, is economical and easy to carry out. Test equipment, a TL reader and photon counter, cost about £ 20,000.

A rapid screening procedure, reliable in about 93% of the cases, can be available immediately to customs laboratories, screening for illegal imports of irradiated food. A more reliable test, 99.9% accurate, is harder to carry out and involves the re-irradiation of the sample. Irradiation will become legal in the UK under new food bill to be introduced shortly.

The TL tests are only effective for fruits, vegetables and spices. Other luminescence tests for poultry and sea food are expected to be ready in near future. The work on three different luminescence techniques is funded by the Ministry of Agriculture, Fisheries and Food.

Cross contamination of non-irradiated food from treated food is one of the main problems the test faces. Although the small size of the particles that are tested means cross contamination can occur, the concentrations of these particles on non-irradiated food would evidently be lower, according to Scottish researchers. Also, sample credibility will be important. Knowledge that in some cases bright lights can interfere with the test could be used to avoid detection. (Journal of Scientific and Industrial Research 48(10), 1989, 499)

## COMMERCIAL INTELLIGENCE

## PRODUCTION (Raw Materials)

## 303 Oilseeds production and oil availability - Year 1988-89

Figures in lakh tonnes

Oilseeds	Production	Oil availability		Total
		Expeller	Solvent	
Groundnut	77.0	16.55	0.75	17.30
Rape/Mustard/Toria	33.0	9.80	0.75	10.55
Sesamum	6.5	2.09	0.10	2.19
Sunflower	5.5	1.71	0.42	2.13
Safflower	5.0	1.07	0.05	1.12
Castor	4.0	1.67	0.02	1.69
Niger	2.0	0.49	0.05	0.54
Linseed	4.5	1.42	-	1.42
Soyabean	17.0	-	2.46	2.46
Total	154.5	34.80	4.60	39.40

(Oils and Oilseeds Journal 41(7-9), 1989, 47)

## 304 Fish production

Fish production in the country in 1988-89 was a record 3,152 million tonnes — four times higher than the production of 7,52,000 tonnes in 1950-51. Stating this at a meeting of the National Fisheries Advisory Board in New Delhi recently, the Agriculture Minister, Mr. Bhajan Lal, said that this was only one-third of the total estimated potential in the country. Fish production needed to be raised to at least six million tonnes by 2000 AD to meet the estimated requirement of the country.

Mr. Bhajan Lal said that to reduce the gap between the demand and supply of fish, it was essential that a comprehensive action plan was adopted to concentrate on aquaculture activity, deep sea fishing, modernisation of the traditional marine fisheries sector and setting up of infrastructure facilities for fish landing, processing and marketing.

All these activities called for better coordination between various departments, financial organisations and private entrepreneurs, he said.

(Economic and Commercial News 19(45), 1989, 10-11)



## EXPORT

## 305 Cashew export

During the eight-month period, January to August 1989, India exported 28,055 tonnes of cashewnuts valued at Rs. 227.31 crores, representing an increase of 36 per cent in quantity and 37 per cent in value over the figures for the same period of 1988.

While exports improved appreciably to Australia, Canada, Czechoslovakia, Japan, Kuwait, Netherlands, New Zealand, Saudi Arabia, Singapore, USA and the Soviet Union, it decreased in the case of the FRG, Hong Kong and U.K.

The purchase of 2,506 tonnes by the USSR was 149 per cent more than in the previous period, while the purchase of 7,014 tonnes by the Netherlands was 22 per cent more. However, the unit value realisation over-all was only Rs.80.09 a kg against Rs. 80.14 in the previous period, showing a marginal reduction of 0.06 per cent. The trend of exports reveals that more countries are now buying Indian cashew than in previous years.

During the January to August period of 1989, 18,190 tonnes of raw cashew were imported in India, valued at Rs. 25.81 crores, a slightly larger quantity than in previous years, for the purpose of processing.

(The Economic Times 5 December 1989, 3)

## 306 Rapeseed extraction exports

There is a veritable boom in exports of rapeseed extractions. These exports amounted to three lakh tonnes valued at Rs. 38 crores in the first half of the current fiscal year against around 41,000 tonnes worth Rs. 6 crores during the corresponding period of the preceding year.

The phenomenal rise in exports is attributed to the bumper crop of rape-mustard and promotional activities undertaken by the Solvent Extractors' Association of India (SEA), according to industry sources.

A delegation sponsored by SEA had visited the Far East and certain other countries in March to tap export potential of rapeseed and other extractions.

As a result of the delegation's visit Japan, Singapore and South Korea, which traditionally depended on China, emerged as major buyers of Indian rapeseed extractions during April-September 1989. (Financial Express 14 October, 1989, 11)

## 307 Soyabean meal exports

The soyabean processing industry, which is in the red, is expected to report better results in 1988-89. The industry, comprising over 80 units mainly located in Madhya Pradesh, is likely to raise its capacity utilisation from a mere 25 per cent to about 50 per cent. Although the industry may not be able to wipe out the losses accumulated during the last few years, most units will be able to show operational profits.

All the units are now actively engaged in processing, thanks to the abundant supply of soyabean this season. Soyabean production has shot up from 8.5 lakh tonnes last season to 17 lakh tonnes this season, in view of the favourable monsoon in Madhya Pradesh, the main soyabean growing State in the country. The soyabean production of this size will yield 13.5 lakh tonnes of soyabean meal. Since the domestic demand for this protein rich meal is negligible, a bulk of it is expected to be exported.

According to present indications exports are expected to exceed 10 lakh tonnes valued at Rs. 350 crores during the current season against 3.5 lakh tonnes worth Rs. 106 crores last season.

Besides a good harvest at home, the favourable price situation in the world market has enabled processors to book orders for the exports of soyabean meal. They are reported to have sold about six lakh tonnes of soyabean meal and out of which three lakh tonnes have already been shipped by them.

The soyabean meal price has shot up by \$ 100 to \$ 250 per tonne in the world market in view of the drought conditions in soyabean growing areas of the U.S., the largest soyabean producing country in the world. Soyabean production in the U.S. is stated to have dropped by 25 per cent to 43 million tonnes this season.

The soyabean processing industry in India can do better if it continues to get its raw material requirements even during the lean period from May to October, and can earn foreign exchange upto Rs. 500 crores. The demand for soyabean meal continues to be good, since it is most acceptable source of protein for compound-feed industry in the world.

(The Oils and Oilseeds Journal 41(7-9), 1989, 63)

## 308 Barley export licence issue method revised

The Commerce Ministry has issued fresh guidelines for the export of barley which is allowed to be sold in foreign markets within a ceiling.

According to a public notification issued on August 28 by the Chief Controller of Imports and Exports (CCI&E), the export of barley by the State Trading Corporation (STC) and private trade will be permitted within the limited ceiling subject to certain conditions. Henceforth, the ceiling for barley export for distribution to the private sector will be placed at the disposal of the Agricultural and



Processed Food Products Export Development Authority (APEDA), New Delhi.

The exporters will be required to register their contracts backed by 100 per cent irrevocable letter of credit with APEDA. They will also have to submit a bank guarantee to the tune of one per cent of the FOB value as per the letter of credit in favour of the government.

APEDA will not allocate more than 10 per cent of the total ceiling to any individual exporter and will release a ceiling in favour of exporters on first-come-first served basis.

On receipt of release advice, along with the bank guarantee, the licensing authority concerned will issue an export licence with a validity period of six months within 48 hours.

The entire export will have to be made within the validity period failing which the bank guarantee will be forfeited by the government and deposit in its account.

Further, no contracts will be allowed to be registered after March 31, 1990, nor would any export be permitted by APEDA even if the quantity of the ceiling remains unutilised.

Similarly, STC will be allowed to export till March 31 and not after that even if the ceiling remains unutilised.  
(Economic and Commercial News 19(37), 1989, 7)

### 309 Marine products export norms

The Minister for Food Processing Industries, Mr. Jagdish Tytler, has hinted at relaxation of laws to promote exports of marine products.

Inaugurating the 10th annual general meeting of the Association of Indian Fishery Industry here on Friday, he regretted that the industry has not been able to respond to commercial pressures despite a number of incentives offered by the Government.

He assured separate fishery zones to evenly distribute efforts for different varieties and species abundantly available in the Indian exclusive economic zone. The Government is working with the industry to ensure an integrated development of the fishing industry, he said.

The President of the Association, Dr. K. R. Prasad, suggested that the Government set up a fish marketing organisation with a network of main and intermediate cold-storage centres and well-designed retail outlets.  
(Financial Express 2 October 1989, 6)

## 210 India should export cooked and peeled shrimps

Our exports of shrimps have declined in quantitative terms from 5624 tonnes to 4901 tonnes (12.8%) and in value terms from 18.05 million to 14.70 million (18.6%). There has been some improvement in export of other marine products, with the result that exports of marine products as a whole recorded a decline of 12.6%. The total shrimp imports of UK from all sources declined by 29.1% in quantity and by nearly 23% in value.

## Shrimps

	1987			1988		
	Q	V	£/kg.	Q	V	£/kg.
Total	34,864	109.26	3.13	24,733	84.18	3.40
India	5,624	18.05	3.21	4,901	14.70	2.99
Pakistan	3,308	8.83	2.67	3,983	9.03	2.27
Bangladesh	2,580	8.13	3.15	2,296	7.87	3.43
Thailand	2,255	7.31	3.24	1,415	4.72	3.34
China	1,534	5.02	3.27	2,033	5.42	2.67

(Quantity: tonnes Value: million £)

In comparison, our exports seem to have fared better than the general decline of British imports. The British market in warm water shrimp has declined by nearly 20% with a corresponding increase taken by cooked and peeled shrimps which India does not export. Hence, the pattern of summer trades last year was one of slow demand and weakening prices.

Owing to this, many of the importers had concluded that there would be no upturn in demand for warm water shrimp and had not procured shrimps from any source. Some of these importers are known to have cleared their stocks at prices even lower than those offered by overseas suppliers. Since the average unit value realisation of cooked and peeled shrimps is more than that of frozen warm water shrimps, India should look into the possibility of exporting the former. Thailand has rapidly adjusted to the new trend and its exports of cooked and peeled product have risen by 65% since 1986. The Marine Products Export Development Authority (MPEDA) organised participation in two major Food Fairs in West-Europe-Sial Food Fairs, Paris in October, 1988, and IFE 1989, London in January, 1989. Visits of trade delegations to the UK and individual sales teams to UK, particularly for IQF shrimps, along with selective publicity in Food/Trade journals is expected to prove useful. (Seafood Export Journal 21(6), 1989, 34-35)



## 311 MEP for basmati rice

The government has increased the minimum export price (MEP) of basmati rice to Rs. 9,500 per tonne (FoB) from Rs. 8,000 per tonne (FoB).

The higher MEP takes retrospective effect from September 15 when public notice was issued by the chief controller of imports and exports.

The MEP has been increased keeping the in view uptrend in the international market, according to official sources.  
(Economic Times 24 September 1989, 1)

## 312 Spices Exports

Spices exports from India crossed the 94,000 tonnes mark in 1988-89 for the first time in eight years, according to agency reports.

The previous peak was in 1979-80 when 114958 tonnes were exported. The 1988-89 performance is the third best in spices exports history, according to an official press release.

The foreign exchange earned from spices, however, was highest in the year 1987-88 at Rs. 2960 million, the year 1988-89 was the second best in terms of export earnings at Rs. 2828 million, the release added.

The commodity-wise target and achievements analysis showed that in terms of quantity, pepper, cardamom (large) ginger, turmeric and miscellaneous spices performed better in 1988-89 exceeding the target set for the year.

Regarding export value in 1988-89 only cardamom (small) fell far short of the target. The major shortfall in demand from the Middle East, primarily because of uncompetitive Indian prices against Guatemala offers and predominance of the domestic market with higher prices. However, an additional 570 tonnes of cardamom (small) could be exported in 1988-89 as compared to 1987-88.

Shortfall in quantitative target of chillies in 1988 was mainly due to delay in shipment to Sri Lanka. Two thousand tonnes targetted for shipment could not be transported fully before April last.  
(Economic and Commercial News 19(36), 1989, 9)

## 313 Incentive scheme for tea exports extended

Union Commerce Minister Dinesh Singh announced that the incentive scheme for south Indian tea exports would be extended by one more year. The extension is in response to a plea made by the United Planters Association of Southern India (UPSAI).  
(Deccan Herald 7 September, 1989, 14)



### 314 Trade centre for export promotion

The steering committee under the chairmanship of the Commerce Secretary, Mr. A.N. Verma, has finalised the draft proposal for setting up an India Trade Centre (ITC) here.

The proposal envisages a budget estimate of Rs. 4.11 crores in the first year. It is proposed to be located in the new exhibition complex which is under construction in the Trade Fair Authority of India (TFAI) complex.

The primary objective of ITC would be to strengthen the institutional framework for export promotion and offer under one roof trade information and trade promotion services designed to cater to the needs of the trade and industry and project India's capability abroad.

The centre would concentrate on 14 product groups which have been identified as thrust sectors for exports. Area-wise it would concentrate on about 60 countries which have growth potential and which cover about 80 per cent of India's exports.

ITC would have a modern well-equipped communication system with computer facilities for collection, storage, retrieval and dissemination of information on trade opportunities, joint ventures and global tenders.

The 14 thrust product group includes agricultural and plantation products, processed foods, ores and minerals, leather and leather manufactures, gems and jewellery, engineering goods, computer software, projects and consultancy, textiles of all fibres, carpets, handicrafts (other than carpets), chemicals, pharmaceuticals and allied products, plastics and plastic products and sports goods.

The thrust countries include 12 from West Europe, seven from East Europe, two each from North America, South America and Caribbean, eight from West Asia 12 from South East and Far East, one each from Central America, Oceanic, three from North Africa and nine from Africa and south of the Sahara.

The objective of ITC would be to provide efficient national-level trade information service for the use of business community, export promotion organisations and government departments, process information relating to thrust products and markets and build up a data bank which would guide and steer promotional activities; collate and compile "user friendly" computer data base in association with existing and recognised international data bases to assist the export community with market intelligence to exchange international data through global network's pass on information with minimum time lag to enable linking intelligent information with immediate export strategy and action; provide facilities for display of products both in India and abroad and provide various infrastructural facilities to visiting buyers.



In suggesting these activities, the committee was guided by the approach that ITC be organised on modular lines with the facility to develop and expand further as it evolves its various functional parameters over a period of time. It would be necessary for the centre, however, to go beyond these limited activities and gradually evolve an aggressive thrust by way of organising buyer-seller meets, contact promotion programmes and department store promotions abroad.

The membership fee proposed by the committee is Rs. 35,000 per annum. The centre would have a chairman and managing director. The information management division is proposed to have 28 officers (nine supporting staff), 18 in trade promotion division (seven) and eight in administrative services division (12).  
(Financial Express 31 October 1989, 1)

## TRADE INFORMATION

### 315 Cooperation in food processing industries

The Union Minister of State for Food Processing Industries, Mr. Jagdish Tytler, has said that India was considering to export meat products to Turkey. He said India was also keen to extend assistance to Turkey by way of transfer of technology in dairy products.

Mr. Tytler said India was interested in the import of seed and seed technology from Turkey.

Mr. Tytler and the Turkish Minister expressed desire to encourage exchange of visits by private businessmen from either country, apart from visits by official delegations, with a view to expanding trade between the two countries in the field of food processing industries.  
(Economic and Commercial News 19(40), 1989, 5)

### 316 Fruit processing unit: Neramac, USSR sign pact

The North Eastern Regional Agricultural Marketing Corporation Ltd (Neramac), will be entering into a joint venture agreement with Russia to set up a fruit juice processing unit. The new unit is likely to come up either in Manipur or Meghalaya.

While Neramac will have a stake of 60 per cent in the new unit, the Russians will contribute to the remaining 40 per cent stake, according to Dr. L. Krishnaswamy, Chairman cum Managing Director of Neramac. The project cost is expected to be around Rs eight crores.

The machinery for the new unit will be provided by Fata Company of Italy and an Italian bank has agreed to provide the requisite finance. Bharat Laminates, Hyderabad, will be manufacturing the desired paper for the tetra-brik aseptic pack.

The Russians have also agreed to import one million packs of Neramac's pineap, a pineapple fruit drink, according to Dr. Krishnaswamy, while speaking at the launch function of 'pineap', here on Friday.

Prepared from 100 per cent pineapple juice concentrate, pineap contains more fruit content than any other ready-to-serve beverage available in the market, he said. Pineap, is made from hand-picked, luscious pineapples grown in the orchards of Tripura and processed in Neramac's Rs. four crores fruit juice concentrate plant.  
(The Economic Times 10 September 1989, 7)

### 317 Food technology from Sweden

Frigo Scandia, a Swedish food preservation equipment making company has introduced in India a modern quick freezing technique which will help increase value added exports of sea foods, processed vegetables and fruits.

The company which has supplied 60 per cent of the freezing equipment in Europe has developed "flofreeze" for quick freezing heavy and sticky vegetables, fruits, sea foods and, "gyro" compact system for spiral belt freezing.

An Indore-based Indian engineering company will manufacture freezing equipment using the Frigo Scandia technology to meet the growing needs of the food processing industry.

The Managing Director of the Swedish company, Mr. Holga Molin, said a Cochin sea food exporter increased realisation overseas by 30 per cent using his company's individual quick freezing technique.

It is estimated that India produces nearly seven million tonnes of fruits and vegetables every year but has an installed capacity of processing only about 0.6 million tonnes. Of this, the utilised capacity is nearly 35 per cent i.e., 0.21 million tonnes. Produce worth Rs.30,000 million is destroyed every year.

India's exports of processed fruits and vegetables were worth only Rs.4.5 million in 1988-89, while fresh fruits and vegetables exports stood at Rs.1200 million. Although India produces around 22,700 tonnes of meat products, its exports is amounted to only Rs.1100 million in 1988-89.

(Economic and Commercial News 19(41), 1989, 5)



- 318 List of foreign technical/financial collaboration cases approved by the Government of India during April 1989 and highlights of industrial licensing of foreign collaboration.

Sl. No.	Name & Address of Indian Company	Name & Address of Foreign Collaborator	Item of Manufacture
30.	Manoj Kumar Daga 16, Hare Street Calcutta-700 001	Lottee Co. Ltd Japan	Chewing Gum
42.	Automatic (Madras) Pvt. Ltd. Dl, Ambattur Indl. Estate, Madras - 600 058	Booth Dispensers Ltd., U.K.  Pace Coatings Ltd U.K.  Pace Coatings Ltd. U.K.	Automatic Vending Machines for Vending Cool drinks Automatic Vending machines for vending coffee tea. Automatic Vending machines for vending snacks.
49.	Sakthi Soyas Ltd. 18, Orace Course Road Coimbatore-641 018.	Commonwealth Dev. Corpn., U.K.	Soyabean Oil
53.	Central Arecanut & Cocoa Marketing & Processing Co-Op. Ltd. (CAMPCO) P.B.No.223 Sahakari Mahal Mangalore-575001	Food Tek Inc. 28-East Hanover Avenue Morris Plains New Jersey 07950 USA	Chocolates

(Seminar Reporteur 19(5), 1989, 22-28)

- 319 Banned pesticides: US Export policy boomerangs

The U.S. policy of allowing shipment abroad of dangerous pesticides banned in the U.S. is now recoiling on the U.S. (President Carter had ruled that pesticides and chemicals banned in the U.S. should not be allowed to be exported. President Reagan reversed that order and Bush is continuing the Reagan policy).

Greenpeace, an International Environmental Organisation, said at a press conference on Sept. 5, that two chemicals - chlordane and heptachlor - manufactured in Memphis (USA) and exported to 25 countries though banned in the USA, have been found in beef imported by the U.S. from Honduras, in Garbanzo beans (chick peas), coffee beans, carrots and parsley from Latin America, in pineapples exported to the

USA from the Philippines, and in edam and provolone cheeses exported by Europe and transhipped to the USA through Puerto Rico. U.S. environmental organisations had predicted that this is precisely what would happen unless the US went back to the Carter policy. It called it "a circle of poison". The U.S. environmental protection agency barred use of the two chemicals for virtually all U.S. agricultural purposes in 1978 when tests showed that they caused tumours in laboratory animals. They are also suspected of causing diseases of the liver, eyes, central nervous system and the adrenal and thyroid glands.

Greenpeace called for legislation to prohibit the manufacture of the pesticides. Reagan took the position that it is not for the U.S. to legislate what foreigners would buy, and if U.S. manufacturers could earn some dollars in the process, it was all right with him. Bush is essentially taking the same stand, though publicly he is an environmentalist.  
(Chemical Weekly 35(1), 1989, 38)

### 320 Irradiated food

More and more countries are gradually accepting the trade in irradiated food and its regional and international trade may start in the 90s, according to the Vienna based International Atomic Energy Agency.

Recent concerns over food borne diseases, food contamination and spoilage, particularly in the tropics had generated worldwide interest in food irradiation technology.

According to the agency press report, atleast 37 countries have accepted and 24 of them are already using food products preserved and processed by controlled use of gamma rays, X-rays, or electron beams.  
(The Economic Times 13 November 1989, 8)

### 321 Duty on pulses cut

The Government has reduced duty on import of pulses from 35 per cent ad-valorem to 10 per cent ad-valorem.

This duty reduction, effective from November 1, has been done to make available adequate quantity of pulses at reasonable prices, says an official release.

(Financial Express 3 November 1989, 1)

### 322 Post-harvest losses

An integrated development plan is being evolved by the Government for increased utilisation of agricultural produce by reducing post-harvest losses, ensuring better returns to farmers, generating better employment and providing the consumer processed food at affordable prices.



Mr. Tytler pointed out that the country produced agro food material worth more than Rs. 60,000 crores, out of which only 12 per cent went in for food processing. He said that 35 to 40 per cent of the country's post harvest fruits and vegetables perished due to bad handling. This, if processed could provide a value addition of Rs. 5,000 crores.

The Minister said that as a policy foreign tie-ups which included a re-export or buy back arrangements would be encouraged. He said the Government followed a liberal policy in the import of machinery for food processing which was not manufactured in India. He said a number of such items had been identified and placed under open general licence.

The policy towards foreign collaborations were also liberal and a number of countries were already involved in Centrally sponsored schemes to increase food production and quality, Mr. Tytler said. (Financial Express 20 October 1989, 6)

### 323 Technology information centre

The Directorate General of Technical Development (DGTD) is in the process of establishing a technology information centre (TIC) to meet the information needs of user industries in select sectors.

This was announced by the secretary (TD) and DGTD, Mr. H. C. Gandhi, at a workshop on technology information services organised by DGTD, the delegation of the commission of the European communities and the Confederation of Engineering Industry (CEI) here on Friday.

Mr. Gandhi indicated that DGTD with the support of the delegation of the commission of the European communities and in consultation with prospective users - industrial units and associations, development finance institutions and RD organisations - was setting up the centre initially to provide information on future development trends and sources of supply of commercially proven technologies.

Mr. Gandhi observed that this was the first centre of its kind to be established in the country and technical assistance of the delegation of the commission of the European communities was, therefore, being sought.

(The Economic Times 2 October 1989, 2)

### 324 Excise incentive on oils withdrawn

The government has withdrawn the excise incentive scheme for use of minor oils in vanaspati and soap with retrospective effect from August 25. A notification has been issued by the finance ministry to this effect.

Under the scheme, manufacturers of vanaspati and soaps could get credit for payment of excise duty in respect of minor oils used by them. The scheme was introduced to encourage use of minor oils in manufacture of vanaspati and soap.

According to an official release, the government has found no longer necessary to continue this scheme after reviewing its relevance in the context of the present levels of production of edible oils in the country and the usage of these minor oils already achieved in the manufacture of soap and vanaspati.

The scheme was introduced in March 1986, under which the vanaspati and soap units were allowed to avail a deduction up to Rs. 1,000 per tonne in excise duty on usage of specified minor oils.

The vanaspati industry has criticised the government decision to withdraw the scheme, which in its opinion would raise the cost of producing vanaspati by Rs. 1,000 per tonne.

In a statement, issued by Mr. G. K. Sood, chief executive of the Vanaspati Manufacturers Association of India, apprehends that the withdrawal of the scheme would halt growth in production of minor oils like rice bran, oils of the tree and forest origin and solvent extracted oils.

Moreover, because of retrospective effect of the decision, the vanaspati industry would be compelled to shell out Rs. 1,1000 per tonne to excise authorities on the despatches made in the last four days without possibility of recovery from the customers, the statement has pointed out.

The credit lying in the books of vanaspati units, which was allowed to be used after a lock-in period of one month, has also been wiped out causing untold loss of excess cost, which the units have incurred by using minor oils in the previous months to accumulate the credit, it is pointed out.

#### FOOD REGULATION, QUALITY CONTROL AND HYGIENE

##### 325 Water (Prevention and Control of Pollution) Amendment Rules 1989

GSR 717(E):- In exercise of the powers conferred by section 63 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974), the Central Government after consultation with the Central Pollution Control Board, hereby makes the following rules further to amend the Water (Prevention and Control of Pollution) Rules, 1975, namely:-



1.(1) These rules may be called the Water (Prevention and Control of Pollution) Amendment Rules, 1989.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Water (Prevention and Control of Pollution) Rules, 1975; (hereinafter referred to as the principal rules), in rule 24, the words "and shall be submitted to the Central Government by the 15th of May each year" shall be omitted.

3. In the principal rules, for rule 32, the following rule shall be substituted namely:-

"32. Application for consent - An application for obtaining the consent of the Central Board for establishing or taking any steps to establish any industry, operation or process or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land (such discharge being hereinafter in this Rule referred to as discharge of sewage); or for bringing into use any new or altered outlet for the discharge of sewage or beginning to make any new discharge of sewage under section 25 or for continuing an existing discharge of sewage under section 26 shall be made to the Central Board in Form XIII".

4. In the principal rules, after rule 33, the following rules shall be inserted, namely:-

"34. Directions (1) Any direction issued under Section 33A shall be in writing.

(2) The direction shall specify the nature of action to be taken and the time within which it shall be complied with by the person, officer or the authority to whom such direction is given.

(3) The person, officer or authority to whom any direction is sought to be issued shall be served with a copy of the proposed direction and shall be given an opportunity of not less than fifteen days from the date of service of a notice to file with an officer designated in this behalf the objections, if any, to the issue of the proposed direction.

(4) Where the proposed direction is for the stoppage or regulation of electricity or water or any other services affecting the carrying on any industry, operation or process and is sought to be issued to an officer or an authority, a copy of the proposed direction shall also be endorsed to the occupier of the industry, operation or process, as the case may be, and objections, if any, filed by the occupier with an officer designated in this behalf shall be dealt with in accordance with the procedures under sub-rules (3) and (5) of this rule.

Provided that no opportunity of being heard shall be given to the occupier, if he had already been heard earlier and the proposed direction referred to in sub rule (3) above for the stoppage or regulation of electricity or water or any other service was the resultant decision of the Central Board after such earlier hearing.

(5) The Central Board shall within a period of 45 days from the date of receipt of the objections, if any, or from the date upto which an opportunity is given to the person, officer or authority to file objections whichever is earlier, after considering the objections, if any, received from the person, officer or authority sought to be directed and for reasons to be recorded in writing, confirm, modify or decide not to issue the proposed direction.

(6) In a case where the Central Board is of the opinion that in view of the likelihood of a grave injury to the environment it is not expedient to provide an opportunity to file objections against the proposed direction, it may, for reasons to be recorded in writing, issue directions, without providing such an opportunity.

(7) Every notice or direction required to be issued under this rule shall be deemed to be duly served:-

(a) Where the person to be served is a company, if the document is addressed in the name of the company and its registered office or at its principal office or place of business and is either -

(i) sent by registered post; or

(ii) delivered at its registered office or at the principal office or place of business;

(b) Where the person to be served is an officer serving Government, if the document is addressed to the person and a copy thereof is endorsed to his Head of the Department and also to the Secretary to the Government as the case may be, incharge of the Department in which for the time being the business relating to the Department in which the officer is employed is transacted and is either:-

(i) sent by registered post, or

(ii) is given or tendered to him;

(c) In any other case, if the document is addressed to the person to be served and --

(i) is given or tendered to him, or

(ii) if such person cannot be found, is affixed on some conspicuous part of his last known place of residence or business or is given or tendered to some adult member of his family or is affixed on some conspicuous part of the land or building, if any, to which it relates, or

(iii) is sent by registered post to that person.



Explanation - For the purposes of this sub-rule:-

(a) "company" means any body corporate and includes a firm or other association of individuals;

(b) "a servant" is not a member of the family.

35. Manner of giving notice:- The manner of giving notice under clause (b) of sub-section (1) of section 49 shall be as follows, namely:-

(1) The notice shall be in writing in Form XV;

(2) If the alleged offence has taken place in a Union Territory, the person giving notice may send notice to:-

(i) the Central Board, and

(ii) the Ministry of Environment and Forests (represented by the Secretary to the Government of India); and

(iii) the Administrator of the Union Territory (represented by the Secretary/Head in-charge of Environment).

(3) The notice shall be sent by registered post acknowledgement due; and

(4) The period of sixty days mentioned in clause (b) of sub-section (1) of section 49 of the Act, shall be reckoned from the date it is first received by one of the authorities mentioned in sub-rule (2)"

(5) In Schedule I of the principal rules, -

(a) for Form XIII, the following shall be substituted, namely:-

#### FORM XIII

Application for consent for establishing or taking any steps for establishment of Industry/operation/process/or any treatment/disposal system for discharge, continuation of discharge under 25 or section 26 of the Water (Prevention and Control of Pollution) Act, 1974.

(See rule 32)

From

Date:.....

.....  
 .....  
 .....

To

The Member Secretary,  
 Central Pollution Control Board,

Sir,

I/We hereby apply for Consent/Renewal of Consent under section 25 or section 26 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) for establishing or taking any steps for establishment of Industry/operation process/or any treatment/disposal system to bring into use any new/alterd outlet for discharge of "sewage/trade effluent"/to continue to discharge\* sewage/trade effluent" from land/premises owned by.....

The other relevant details are as below:

1. Full name of the applicant.....

2. Nationality of the applicant.....

3. Status of the applicant:

(a) Individual

(b) Proprietary concern

(c) Partnership firm (whether registered or unregistered)

(d) Joint family concern

(e) Private Limited Company

(f) Public Limited Company

(g) Government Company

(1) State Government

(2) Central Government

(3) Union Territory

(h) Foreign Company

(if a foreign company, the details of registration incorporation, etc.)

(i) Any other Association or Body:

4. Name, Address and Telephone Nos. of the Applicant.

(the full list of individuals, partners, persons, Chairman (full-time or part-time), Managing Directors, Managing Partners, (Directors (Full time or part time), other kinds of office bearers are to be furnished with their period of tenure in the respective office, with telephone Nos. and address).



## 5. Address of the Industry :

(Survey No. Khasra No., location as per the revenue records, Village Firka, Tehsil, District, Police Station or SHO, jurisdiction of the First-Class Magistrate).

## 6. Details of commissioning, etc:-

- (a) Approximate date of the proposed commissioning of work.
- (b) Expected date of production:

## 7. Total number of employees expected to be employed.

8. Details of licence, if any obtained under the provisions of Industrial Development Regulations Act, 1951, --

9. Name of the person authorised to sign this form (the original authorisation except in the case of individual/proprietary concern is to be enclosed).

10. (a) attach the list of all raw materials and chemicals used per month.

(b) Licensed Annual Capacity of the Factory/Industry.

11. State daily quantity of water in kilolitres utilised and its source (domestic/industrial/process/boiler/cooling/others).

12. (a) State the daily maximum quantity of effluents and mode of disposal (sewer or drains or river).

Also attach analysis report of the effluents. Type of effluent quantity in kilolitres, Mode of disposal.

- (i) Domestic
- (ii) Industrial.

(b) Quality of effluent currently being discharged or expected to be discharged.

(c) What monitoring arrangement is currently there or proposed.

13. State whether you have any treatment plant for industrial, domestic or combined effluents.

Yes/No.

If yes, attach a description of the process of treatment in brief. Attach information on the quality of treated effluent vis-a-vis the standards.

14. State details of solid wastes generated in the process or during waste treatment.

Description	Quantity	Method of collection	Method of disposal
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15. I/We further declare that the information furnished above is correct to the best of my/our knowledge.

16. I/We hereby submit that in case of change either of the point of discharge or the quantity of discharge or its quality, a fresh application for CONSENT shall be made and until such CONSENT is granted no change shall be made.

17. I/We hereby agree to submit to the Central Board an application for renewal of consent one month in advance of the date of expiry of the consented period for outlet/discharge if to be continued thereafter.

18. I/We undertake to furnish any other information within one month of its being called by the Central Board.

19. I/We enclose herewith cash receipt no./bank draft no.....dated..... for Rs.....(Rupees.....)..... in favour of the Central Pollution Control Board, New Delhi, as fees payable under section 25 of the Act.

Yours faithfully,  
Signature of the applicant

Note: \*Strike out which is not relevant.

(b) after Form XIV, the following new Form shall be inserted, namely:-

"FORM XV

(See Rule 35)

FORM OF NOTICE

By registered post  
acknowledgement due



From

.....  
.....  
.....  
.....

To

.....  
.....  
.....

Notice under section 49 of the Water (Prevention and Control of Pollution) Act, 1974.

Whereas an offence under the Water (Prevention and Control of Pollution) Act, 1974, has been committed/is being committed by.....

(2) I/We hereby give notice of 60 days under section 49 of the Water (Prevention and Control of Pollution) Act, 1974 of my/our intention to file a complaint in the court against.....  
(2) for violation of section.....of the Water (Prevention and Control of Pollution) Act, 1974.

In support of my/our notice, I am/we are endorsing the following documents (3) as evidence of proof of violation of the Water (Prevention and Control of Pollution) Act, 1974.

.....Signature(s)

Place.....

Date.....

**Explanation :-**

(1) In case the notice is given in the name of a company, documentary evidence authorising the person to sign the notice on behalf of the company shall be enclosed to this notice. Company for this purpose means a company defined in Explanation to section 47 of the Act.

(2) Here give the name and address of the alleged ocender. In case of a manufacturing/processing operating unit, indicate the name/location/nature of activity, etc.

(3) Documentary evidence shall include photographs/technical reports/health reports of the area etc. for enabling enquiry into the alleged violation/offence".

No. Q-15011/3/88-CPW

G. SUNDARAM, Jt. Secy.

(The Gazette of India Part II - Section 3-sub-section(i) No.391, 27 July 1989)

### 326 Vitamins protect against cancer

There is now overwhelming evidence that a diet rich in fruit and vegetables can help to reduce the risk of cancer, an epidemiologist from the National Cancer Institute in the US said earlier this week. Gladys Block, speaking before the opening of an international conference on the role of vitamins in preventing disease, said that there had never been an adequate campaign to persuade the public that there is "strong scientific evidence" that vitamins can help to protect against cancer.

William Pryor, professor of chemistry and biochemistry at Louisiana State University in the US and chairman of the conference, said that many doctors did not want to recommend vitamin supplements for fear that people would take these instead of eating a balanced diet. It would be better, he said, if people could eat plenty of fresh fruit and vegetables.

Block said that the American guidelines on diet suggest that people eat five servings of fruit and vegetables a day, yet surveys have shown that many people consume much less than this amount. It would not be possible to obtain the recommended daily intake of vitamin C, for example, from a single serving of vegetables, she said.

Vitamins such as C and E, as well as the compound known as provitamin A, or betacarotene, exert their protective effect by combating damaging reactions in the body's cells.  
(New Scientist 7 October 1989, 23)



### 327 Tapioca the culprit behind goitre in Kerala: study

Tapioca, a staple in the Kerala diet, could be implicated in the development of diabetes and goitre in the State.

A laboratory study carried out on rats at the Trichur Medical College, and presented at the recent all India endocrine conference, suggests that regular consumption of Tapioca might lead to pancreatic and thyroid damage. The damage is attributed to cyanogenic glycosides in tapioca.

The study by Dr. Annamma Mathew and Dr. Zachariah Thomas corroborates the correlation reported from other parts of the world (notably Africa) between tapioca consumption and the fibro calculus pancreatic diabetes (FCPD). It is a common form of diabetes in Kerala.

If regular tapioca consumption causes thyroid damage, as suggested by the study, it would explain the incidence of goitre in the State. Goitre is endemic along the sub-Himalayan belt and has been held to be the result of insufficient iodine in the diet. But goitre should be negligible in coastal areas like Kerala, where there is ample fish consumption.  
(The Hindu 1 November 1989, 3)

### 328 Aflatoxin in soyabean and sunflower

Samples of soyabean and sunflower seeds were procured from different areas like Madhya Pradesh, Tamil Nadu, Karnataka etc. In all 29 soyabean and 76 sunflower seed samples were analysed for aflatoxin content at the Central Agamark Laboratory, Nagpur.

Out of the 29 samples of soybean 4 samples of soyabean were found to be affected by aflatoxin in the range of 25-120 ppb. Regarding sunflower seed samples, 5 samples out of 67 were found infected with aflatoxin in the range of 60 to 750 ppb. Though the aflatoxin content was more in soyabean than in sunflower, the percentage of infected sunflower seed samples was only 7.4 while that of soyabean samples was 17. The results clearly indicate that sunflower seed definitely supports the aflatoxin production in Indian climatic conditions.

Under the statutory food laws in our country, maximum limit for aflatoxin content has been prescribed only for groundnut kernel - viz 30 ppb. However the other countries have also prescribed the maximum limit for aflatoxin content in various commodities upto 50 ppb.

In view of the above, it is suggested that appropriate limits for aflatoxin content be prescribed under the Indian Food Laws for these two oilseeds.

(The Oils and Oilseeds Journal 41(7-9), 1989, 87-89)

## 329 High DDT residue in milk

A brand of packed milk which is, widely marketed all over the country by a leading company is found to have DDT residues much above the maximum residue limit (MRL) prescribed by the World Health Organisation, it is learnt.

WHO has prescribed MRI for various pesticide compounds in case of all the agrobased products including milk and has intimated all the member countries for suitable action. For milk and milk products, WHO has set a tolerance limit for DDT residues at 1.25 PPM (part per million).

The high rate of DDT has come to light following a test conducted by a leading private sector laboratory a few weeks ago. The findings have clearly shown the residues at an alarmingly higher level in the tested samples.

According to informed sources the entire milk collected by this company from the farmers of major milk producing centres contain high rate of DDT residues.

(The Economic Times 16 October 1989, 6)

## 330 Ban on non-iodized salt sale

Iodine, in traces, is considered as one of the essential elements for proper functioning of the hormones of thyroid glands which control the basic rate of metabolism in human life. Iodine deficiency, according to experts can cause a number of complications, such as goitre, swelling of thyroid glands, abortion and slowed physical and intellectual development.

In view of the fact that non-iodized salt is one of the factors creating major health hazards, its sale for edible purposes has been made a penal offence by the Delhi Administration. According to an order issued by the Administration under the Prevention of Food Adulteration Act, 1954, the sale of non-iodized common salt on or after 1 June 1989 will be punishable with imprisonment for a period not less than six months, subject to a maximum period of three years and/or a fine of at least Rs.1000.

For the guidance of the manufacturers, the Bureau of Indian Standards has published an Indian Standard (IS 7224:1985) which prescribes the requirements and methods of sampling and test for iodized salt. The Standard, which recommends the use of potassium iodate or any other iodate for iodizing the salt, specifies addition of a minimum of 20 parts per million of iodine to it. It also prescribes for water-soluble matter, matter soluble in water than sodium chloride and chloride content.

(Standards India 3(1), 1989, 13)



### 331 Unwashed green vegetables can cause brain infection

Vegetarians beware, Some of the green vegetables, when taken without washing can cause neurocysticercosis (NCC), an infection of the central nervous system, specially the brain.

According to earlier theories the disease was thought to be confined only to pork eaters. It was regarded as infection of the nervous system caused by the larval stage of the pork tape worm - *Taenia solium*.

Neurosurgeons participating in the ninth International Congress of Neurosurgery here observed that the disease was not confined to pork eaters only. It had been reported in vegetarians and also in those who do not consume pork.

The parasite when ingested through food, breaks out of the intestine swims up the bloodstream and enters the brain, making the organ swell and throwing patients into seizures. "Unwashed and poorly cooked green vegetables used in salads breed the parasite and are a major source of the infection in India," Dr. Vijay Kak, a neurosurgeon from Chandigarh said.

The spectrum of NCC infection in India is different from that observed in other endemic areas like Latin America and Africa Dr. Sanjiv Bhatia observed. Mexican doctors have reported the infection to be localised and treated by surgery, but the Indian variety of the infection is more diffuse and surgery does not usually help, he said.

(Deccan Herald 14 October 1989, 11)

### 332 Salmonella survives even in cooked eggs

Four teams of scientists from public health laboratories of U.K. have determined how salmonella survives in cooked eggs.

The scientists from laboratories in Exeter, Poole, Sheffield and London, injected known amounts of known strains of salmonella bacteria into the yolks of raw eggs. They then cooked the eggs in a variety of ways and attempted to recover viable bacteria from the finished products. Their results show that the salmonella bacteria, which are present in the yolk of eggs, are able to survive in cooked eggs.

The scientists boiled some eggs for up to eight minutes and fried others with the yolk facing up. When they did this, some or all of the yolk remained liquid and the yolk did not reach 80 C, the temperature that kills salmonella. The scientists found that the number of salmonella that survived did not seem to depend on the strain or on the quantity of bacteria that they inoculated.

In some of these experiments, the researchers used *Salmonella enteritidis* PT 141, the strain implicated in recent outbreaks of food poisoning associated with eggs. They were able to recover up to 75 per cent of the original bacteria alive.

Next, the scientists subjected the various strains of salmonella to more extreme heat; they scrambled them or fried them "over-easy" that is, turning them over halfway through cooking. Here, they found that the survival of salmonella depended more on the strain or the size of the initial inoculum. *S. enteritidis* PT141 was more sensitive to heat than most other strains.

When the scientists inoculated eggs with less than  $10^8$  cells per gram of yolk or per gram of a mixture of yolk and milk, they were able to destroy all the bacteria in a number of ways: by cooking scrambled egg rapidly at high temperature, by boiling for nine minutes or more, or by frying the egg on both sides until all the yolk had solidified.

The scientists admit that the size of the inoculum is large. But they showed that a low inoculum of  $10^7$  cells per yolk could increase to this level in just 48 hours at room temperature. They warn that eggs should be kept in the fridge, then allowed to warm to room temperature before cooking. This will ensure that during cooking the whole egg reaches temperatures that are lethal to Salmonella. (New Scientist 23 September 1989, 32)

### 333 Quick test for cholesterol levels

Soviet scientists at the Institute of Physico Chemical Medicine in Moscow claim to have developed a simple method for estimating the levels of cholesterol in the blood based on levels of cholesterol in the skin. The diagnostic kit, now being offered for export, consists of a cholesterol-binding reagent and a solution that changes colour in the presence of cholesterol.

The scientists place three drops of the reagent - each of a different concentration - on the palm of the hand, then wash it off after a short time. They then apply drops of the solution to the same spots on the hand.

If the solution turns red only where the concentration of the reagent is highest the individual is considered to be healthy. If the spot with a medium concentration of reagent also turns red, the person is considered to be at risk of developing coronary heart disease.

If all three spots develop colour, the person supposedly already has clinical disease. The researchers have not yet given details of the reagent.  
(The Hindu 25 October 1989, 23)

### 334 Urinary stones and tamarind

Tamarind, a regular ingredient of south Indian dishes, may be responsible for the low incidence of urinary stone disease in the southern states compared to north India, according to researchers in the Trivandrum medical college hospital, reports UNI.



A team of researchers led by Dr. Fazil Marickar, Associate Professor of Surgery, has found that tamarind, which is rich in potassium bitartrate and tartaric acid, inhibited crystallisation of calcium oxalate in urine.

Administration of tamarind and tomato produced a significant reduction in the number and size of calcium oxalate dihydrate (COD) and calcium oxalate monohydrate (COM) crystals in short-term and long-term studies.

In about 52 per cent of the patients the COD and COM crystals disappeared after tamarind treatment. In the rest the mean number of crystals per high power field was brought down from eight to two. The effect of tomato was less remarkable than tamarind.  
(NIPCCD Newsletter 8(5), 1988, 11)

## TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

### 335 Modern food to expand

Modern Food Industries (India) Ltd will be setting up two more new bread plants to its existing unit in Delhi. Besides, the company has an ambitious plan to launch a fruit processing unit in Jammu and Kashmir and a marine food processing unit.,  
(Industrial Products Finder 17(12), 1989, 113)

### 336 Pact with US on food processing

To avoid wastage of food and promote exports, India will co-operate with the United States in a big way in the comparatively new field of food processing and preservation.

This was disclosed by Mr. Jagdish Tytler, Minister of State for Food Processing, while talking to newsmen recently. He said that the US had agreed to help India set up a training institute for food processing and also exchange business delegation to identify areas for further cooperation.  
(Industrial Products Finder 17(12), 1989, 103)

### 337 Amrit protein unit inaugurated

Amrit Protein Foods Ltd., a company promoted by Amrit Banaspati Co. Ltd, was inaugurated recently. The unit set up at Ghaziabad, at a total outlay of Rs.15 crore, will produce soya milk and soya milk beverages in various flavours.  
(Chemical Products Finder 8(3), 1989, 133)

## 338 All seasons foods' new plant

All Seasons Foods' new plant at Nasik is expected to launch production soon. The plant will be making not only ready-to-eat meals but also many new products such as baby foods, milk and malt-based products and energy-based products etc. The company's current year target is to achieve a turnover of Rs.100 crore. During 1988, its sales have increased to touch Rs.25.76 crore.  
(Industrial Products Finder 17(10), 1989, 79)

## 339 Citric acid plant in Punjab

The first citric acid plant in the country using sugar as raw material will be set up in Punjab. The Punjab State Federation of Cooperative Sugar Mills' Managing Director, Mr. Gurdev Singh, said that the Rs.15 crore plant will have a capacity to produce 5,000 tonnes of citric acid every year. It will be set up in collaboration with a Polish firm. The plant will provide direct employment to 150 people and indirect employment to hundreds of others.  
(Chemical Weekly 34(49), 1989, 69)

## 340 New packaging machines

*for edible oil.*

An Indo-German collaboration venture has just developed a new packaging machine that may well revolutionise the role of packaging industry in this country.

The Indian firm concerned is the Cockerill Equipment Private Limited and the German partner is Piepenbrock Verpackungstechnik.

The joint venture has come up with a truly customised yet versatile packaging machine which can pack oils as well as, host of other products. It has exciting possibilities and may well be the answer to the problems of the wide network of the public distribution system which has for long looked for just this sort of machine. It will soon be produced on a commercial scale in India.

The new machine will enable various government-run organisations and private companies processing edible oils to finally introduce the perfect flexible laminated film pouch with edible oil packed in it. The film pouches are guaranteed, unadulterated and uncontaminated and edible oils will not turn rancid while still on the shelf.

Cockerill Equipment expects that the spinoff from its joint effort with Piepenbrock Verpackungstechnik can mean an expanding market for this new machine, painstakingly developed for India, in other countries of South East Asia with similar edible oil distribution and consumption patterns. According to the firm, edible oils have never been packed in this manner for such consumption purposes, anywhere else in the world.



This association covers a wide spectrum of machines, and complete plant equipment for use in packaging and food processing.

For details contact: Cockerill Equipment P.Ltd., 12, Tribhuvan Road, Ratan House, Bombay - 400 004.

### PERSONALIA

-Nii-

We are also looking for consultants for food industries and require details of your <sup>new</sup> machines for oil packing and others. Pl. provide us with detailed along with price list.

### BIBLIOGRAPHIES JUST PUBLISHED

The National Information Centre for Food Science and Technology, CFTRI, Mysore, has just compiled the following annotated bibliographies:

(i) BEET MOLASSES

covers the period from 1959 to 1988,  
lists 94 titles with abstracts

(ii) GRAIN MOISTURE METERS

covers the period from 1959 to 1988,  
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SPECIAL ARTICLEFLEXIBLE PACKAGING OF HEAT PROCESSED AND FROZEN FOODS

M. Mahadevaiah

Central Food Technological Research Institute, Mysore-570013

RETORTABLE POUCH

Retortable pouch has been developed as an alternative to metal cans and glass bottles for packing processed food products. The retortable pouch is a flexible laminated pouch which can withstand thermal processing temperatures of 120-130°C, and combines the advantages of metal can and the plastic boil-in-bag. The material for retort pouch must also provide superior barrier properties for a long shelf-life, seal integrity toughness and puncture resistance.

Development of the retort pouch concept began in the United States in the early 1950's. Much of the work done by the U.S. Army Natick Development Centre was to use retort pouches to replace the metal cans in military combat rations. Material development was pioneered by Reynold's Metals Co., and Continental group.

The retort pouch products were test marketed during 1960's in the U.S. and the results were encouraging. Japanese and European firms obtained U.S. methods and technology through licencing arrangement which allowed them the production of food products packed in retort pouch in the late 1960's. The retort pouch concept is gaining popularity in these countries and a number of food products are being packed in retortable pouches under commercial scale. Many developments have taken place in recent years on this line with special reference to the development of packaging materials and the processing methods.

In India, preliminary research investigations have been carried out at CFTRI, Mysore, to evaluate the suitability of various combinations of laminate pouches with number of indigenous food products and to standardise the processing conditions. The results of these studies are encouraging.

Packaging materials

The development of suitable packaging materials for packing processed food products is the basic criteria for the success of the process. The first material developed for this purpose was a laminate made of polyester/aluminium foil/polyvinyl chloride. Later on this was superseded by many other combinations like polyester/foil/modified polyolefin (high density polyethylene blended with polyisobutylene), polyester/foil/high density polyethylene, polyester/foil/nylon and polyester/foil/cast polypropylene. The two prevailing three ply laminates are polyester/foil/modified polyolefin and polyester/foil/polypropylene - ethylene copolymer. Typical current retort pouch materials are given in Table 1. For research



studies at CFTRI, pouches made of indigenous polypropylene, nylon/cast polypropylene and polyester/foil/cast polypropylene obtained from Japan and West Germany were used.

TABLE 1

## TYPICAL CURRENT RETORT POUCH MATERIALS

---

9 to 25 micron polyester/9 to 12 micron foil/75 micron modified polyolefin (C-79).

12 to 25 micron polyester/9 to 25 micron foil/50 to 85 micron ethylene-propylene copolymers and/or blends

15 to 30 micron polyamide/50 to 75 micron cast polypropylene

15 micron polyamide/70 micron modified polyolefin (C-76)

30 to 40 micron polyamide/50 to 75 micron medium density polyethylene

30 to 50 micron polyamide/50 to 75 micron polypropylene copolymer and/or blend

12 micron polyester/12 micron foil/12 micron polyester/75 to 85 micron ethylene propylene copolymers and/or blends

12 micron polyester/9 micron foil/15 micron oriented polyamide (Nylor 6)/50 micron polypropylene

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Among the requirements for retort pouch films, for foil laminates the gas permeability should be less than  $15 \text{ cc/m}^2/24 \text{ hr./atm.}$ , water vapour transmission rate should be less than  $0.8 \text{ g/m}^2/24 \text{ hr.}$  and should resist temperatures from below  $0^\circ\text{C}$  to  $121^\circ\text{C}$ . For foil free laminates, where short shelf-life is expected, the gas permeabilities can be  $77-93 \text{ c.c./m}^2/24 \text{ hr./atm}$  and moisture vapour transmission rates of 31 to 46  $\text{gm/m}^2/24 \text{ hr.}$  are acceptable. The range of current performance requirements for sterilizable materials is incorporated in Table 2.

TABLE 2

# RANGE OF CURRENT PERFORMANCE REQUIREMENTS FOR STERILIZABLE MATERIALS

Requirement	Criteria
Sterilization temperature	116 - 145 C
Oxygen permeability	0 cc/m <sup>2</sup> /24 hr/atm
Water vapour transmission rate	0 g/m/24 hr
Seal strength (tensile)	2-3.3 kg/10 mm
Bond strength	150-500 g/10 mm
Heat seal range	160-260 C
Thickness tolerances	+2 microns (inner ply only) 10% value $\pm 7.0$ g/m <sup>2</sup> (inner ply only)
Burst test	7.5 kg/15 mm seal (method 1) $17.2 \times 10^4$ Pascals for 30 sec.
Residuals solvent (taint)	30 mg/m <sup>2</sup> (method 4) 0.5 ppm as toluol.

The packaging materials should also resist the food simulating solvents such as water and acetic acid solutions under thermal processing temperature conditions at about 121°C.

It is preferable to have flat shape to attain better sterility with minimum overcooling of peripheral volumes, and to gain convenience through fast reheating for consumption.

## Production systems

Filling systems used for retort pouches range from manual to fully automatic with variations and combination of both contamination of seal surfaces with food or moisture should be avoided at the time of filling.

Unit operations for packing of food products in retortable pouches are mostly similar to canning operations. The following three different systems are adopted for this purpose.



(i) Use of preformed pouches, manual or automatic pouch opening and filling, manual transfer to vacuum and sealing machine and subsequently processing.

(ii) Pouches are formed from roller stock film, filling of the product, partial sealing, removal of air from pouches, sealing and processing.

(iii) A lower web of foil free formable films is drawn horizontally over heated dies and vacuum is applied into multiple pocket or tray configuration. After putting the product in the pockets a sound web is drawn over the top of the lower web and heat sealed.

As in the case of metal cans, air has to be removed from the pouch by adopting any one of the following methods.

Snorkel technique, vacuum chambers, counter external pressure and steam flush.

Fat and water contamination of seal areas reduces seal strength considerably. Impulse heat sealing is generally more desirable than conventional heat sealing of pouch, since seal area contamination can be more easily overcome. Proper resistance seal bar (heated jaw, design can also overcome seal area contamination to a great extent.

A simple flat shaped filling funnels have been fabricated and adopted at CFTRI for filling liquid and semi solid products like meat curry and concentrated gravy to avoid seal contamination. Exhausting was carried out by putting pouches in the perforated vertical stands fabricated at CFTRI and passing through conventional steam exhaust box and sealed by using impulse sealer.

### Process determination

Thermoprocessing conditions like process time and temperature for pouches have been generally determined by methods adopted for metal cans based on the procedures established by Ball and subsequent thermoprocess investigators<sup>2</sup>.

Generally  $F_0$  values suitable for commercially canned products are adequate for retort pouches. However, modifications have been made for specific product process requirements.

Heat penetration studies have been carried out at CFTRI to determine the process time for some of the meat products and vegetables packed in different sizes of retortable pouches (unpublished data).

### Processing of Retort Pouches

Thinness of the packaging material and flat shapes of the new containers permit very high rates of heat transfer and the benefits of a high temperature short time sterilizing process. But control of this process is usually critical, whether the thermal media is hot water with over-riding air pressure, standard steam cook, or steam-air mixture<sup>3,4</sup>.

TABLE 3

## COMMERCIALIALLY FEASIBLE RETORT POUCHED PRODUCTS

Type of Product	Typical Products	
Sauces with meat seafood and/or vegetables (ready meals)	Beef stew	Beef stroganoff
	Stewed veal with peas Hungarian goulash Rice with seafood Assorted meat curries Chicken a la king	Sweet and sour pork Sukiyaki Beef bordelaise Bamboo shoots in sauce Beef slices in barbecue sauce
	Sloppy Joe	Meatballs in barbe- cue sauce
Sauces	Bar-B-Q chicken sauce	Roasted chicken in
	Duckling with chestnuts	Rabbit with rice
	Prepared tomato sauces	Bean-cured season- ing sauce
Meats (minimum liquid)	Rice sauce (with) and Cream sauces (with vegetables)	without mushrooms
	Ham Meatballs	Pork luncheon fingers Sliced pork lunch- eon meat
	Chicken hamburger Frankfurters Beef loaf Pet foods Potatoes	Beefsteak Ham & chicken loaf Tuna meat (in oil)
Vegetables	Sauerkraut	Carrots (some in sauces)
	Beetroots	Mushrooms (some in sauces)
	Beans in tomato sauce Crushed pineapple Apples Applesauce Variety Fruitcake	Celery in cheese sauce Fried rice Rhubarb Prunes
Fruits	Spice cake	Shark's fin Cherry, maple, chocolate Orange and pine- apple nut cakes
	Pound cake	
	Rhum baba	



The retorts which were earlier developed for sterilizing food in cans or jars, have been adopted to the new pouch and semi rigid containers. Although, they appear satisfactory, actual tests indicate an important lack of uniformity in heating medium temp. throughout the retort load.

In order to achieve an effective HTST process by taking the advantage of the rapid heat transfer characteristics of the new containers, FMC corp. developed a batch type system which would properly sterilize the new flexible convenience food containers. A list of commercially feasible retort pouched products is given in Table 3.

#### Quality of the food products packed in retort pouch

The results of the various workers on the quality of different food products in retort pouches are reviewed below.

Fruit products like peaches in syrup, rhubarb in syrup, cranberry sauce, mango pulp, passion fruit pulp etc., packed in foil pouches were found to be better than the canned product as judged by sensory evaluation with respect to their physico-chemical characteristics. The shelf-life was found to extend upto 18 months at 20°C.

Similarly the quality of some vegetables packed in retort pouches were found to be better than canned products. The pouched vegetables retained better nutrients like vitamin C, calcium, thiamine, riboflavin etc. as compared to the canned vegetables. The shelf-life in nylon/pp pouches was found to be 1 month at 20°C, and in foil pouches 12 months at 20°C.

A wide range of meat and fish products were packed in retort pouches and shelf-life studies have been carried out by many research workers. The studies include the determination of thermal process time, influence of residual gases, and the sensory quality of the products. The results indicated that the products packed in foil free laminates the shelf-life is low ranging from 1 to 5 months at 20°C and in foil laminates it extends upto 2 years at 20°C.

However, the experiments carried out at CFTRI indicated that meat products such as concentrated meat gravy, meat chunks in curry and meat biryani packed in pouches of nylon and cast polypropylene, kept well upto 1 month at 37°C and thereafter flavour loss was fast. On the otherhand meat products packed in foil laminate pouches, the products were acceptable upto 6 months at 37°C. Incidentally it was noticed that the flavour of the products stored at 37°C was better as compared to the products stored at ambient temp. of 25-30°C. Approximate shelf-life of different food products packed in retortable pouches is incorporated in Table 4.

TABLE 4

## APPROXIMATE SHELF LIFE OF RETORT-POUCHED FOODS

Pouch construction	Outer package	Products	Approximate shelf life
30 micron nylon / 60 micron cast polypropylene	Paperboard carton	Vegetables	1 month at 20°C
40 micron nylon / 12 micron PVdC / 50 micron polypropylene	Paperboard carton	Meat entrees Vegetables	5 months at 20°C
30 micron nylon / 60 micron cast polypropylene	Formed polymer tray flushed with nitrogen	Vegetables	7 months at 20°C
12 micron polyester / 9 micron foil / 75 micron polypropylene or polyethylene blend	Paperboard carton	Entrees	2 years at 20°C commercially 8 years at 20°C for military rations

Secondary Packages for retortable pouches

Folding cartons are used as an external wrap for the pouch. The alternate method of secondary packaging is the skin packaging.

Economics

For packing of food products in retort pouch, the initial investment on the machinery for filling/sealing and processing is high as compared to the packing of food products in traditional metal containers. However, this is compensated by the low cost of the packaging materials, storage space, transportation of empty and filled pouches.

ASEPTIC PACKAGING

Aseptic packaging technology was developed to produce sterilized shelf stable products which are free from bacteria and spores, and packed in economical containers for long range distribution, retaining the good quality of the product.

The process involves separate sterilization of the product and the package, bringing the two together in a sterile environment, filling and sealing the package to prevent recontamination. The basic operation consists of (i) commercial sterilization of the product by heating to predetermined time and maintaining the sterili-



ty till they are cooled, (ii) filling into sterile containers and sealing aseptically<sup>6</sup>.

Aseptic packaging process is adopted for packing liquid products like fruit juices and soft drinks in unit packs and for fruit juice concentrates and fruit puree, tomato puree and paste and pulp in bulk packages. The popular systems available commercially are tetrabrick, tetrapack, Tito Manzini, Franrica, Scholle Autofill, Alfa Laval Plant, combibloc, crepaco, cherry Burrell, steriglen, Elpo, Bosch etc. .

#### Packaging materials and forms

The popular flexible packaging material used for packing fruit juices, ready-to-serve beverages and soft drinks consists of polyethylene coating (0.65 mil)/paper board (240 g/m<sup>2</sup>), polyethylene lamination (0.65 mil), aluminium foil (0.30 mil<sup>2</sup>)/polyethylene coating (0.35 ml), polyethylene coating (1.5 mil). The material used for tetrapak consists of 1 mil polyethylene/0.35 mil aluminium foil/0.5 mil poly/16 mil kraft paper board/0.5 mil polyethylene. Brick pack consists of PE/ Paper/PE/aluminium foil/PE lamination<sup>7,8</sup>, which is formed, filled and sealed into a brick shaped carton.

Bag-in-box system is an important development of aseptic packaging technology for bulk packaging of various food products. In this system flexible bag is placed inside a rigid transport container of corrugated or solid fibre board. The bag is made of material having high strength and excellent barrier property which could be presterilized.

Earlier studies indicated that laminated films with aluminium foil and polyvinylidene chloride (PVDC) copolymer coatings with polyethylene or polypropylene as the sealant layer is suitable in this system.

The newer structures used are made of coextruded PE/PVDC/PE for short shelf life and PE/Metallised polyester/PE for long shelf life. Such packages are available in the capacities ranging from about 5 to 1000 litres. Corrugated fibre board box provides physical protection for the bag, stack strength and means for transportation and handling.

Bulk packaging in such packaging materials are quite relevant to Indian conditions for packing fruit juice concentrates, fruit pulps, purees and tomato paste. These are very convenient for export and for storing in food processing units for subsequent preparation of different products.

#### Sterilization of packaging materials

Sterilization of packaging material is a very important operation to free the surface from microorganisms before processing. Different methods are followed to achieve this using hydrogen peroxide for effective destruction of microorganisms on plastics. Radiation sterilization using gamma rays, UV or electron acceleration is used for

sterilization of bulk aseptic bags.

### Quality of the aseptically packed products

Fruit juices and RTS beverages packed in tetrapak cartons based on waxed paper/foil/poly was found to give a shelf-life of about four months as compared to the conventional packs which normally gives about 2 months shelf-life. Chan et al., have studied the effect of storage temperature and time on the quality of aseptically processed bag-in-box package of guava and papaya puree. Considerable changes were observed in colour, flavour and ascorbic acid content at 38°C. The ascorbic acid loss was about 30% at 38°C after 3 months in guava puree. Similar trend was noticed with papaya.

### Traditional method of packaging fruit products in flexible packaging materials

Fruit juices, fruit juice concentrate and fruit pulps can also be packed by traditional processing methods in different types of flexible packaging materials, which can be adopted in the existing fruit processing factories in the country.

The following different types of materials can be used for this purpose.

- i) 12 micron plain polyester/37 micron polyethylene,
- ii) 12 micron metallised polyester/100 micron polyethylene,
- iii) 12 micron polyester/12 micron aluminium foil/100 micron polyethylene.
- iv) One side 12 micron metallised polyester/112 micron HD-LD coextruded and other side 12 micron plain polyester/112 micron HD-LD coextruded.

Experiments were carried out at CFTRI by filling the mango juice heated to 85°C, sealing and processing in water at 85°C, for 10 min. and cooled.

The results indicated that pouches of PET/foil/PE was suitable for packing mango juice upto 10 weeks storage at ambient temp (25-30°C) and 8 weeks at 37°C Met.PET/PE and Met.PET/HD-LD + PET/HD-LD was suitable upto 7 weeks storage at ambient temp. and 5 weeks at 37°C. PET/PE was having poor shelf-life as compared to other flexible packaging materials.

### PACKAGING OF FROZEN FRUITS AND VEGETABLES

Food Products like fruits, vegetables, meat and fish are preserved by freezing process which will inactivate the microorganisms. Freezing is carried out at a temperature below -18°C., and maintaining the same temperature during storage in order to avoid microbial growth. Fruits are frozen for later use in making preserves, jam, jellies, ice cream, desserts etc. It is preferable to freeze in the form of pulp or crushed form to eliminate oxidation during freezing, storage and thawing and to have long shelf life. Vegetables, meat and fish in the original form or after converting into different



products are also freezed on a commercial scale to extend their shelf-life.

### Packaging of frozen products

To prevent deteriorative changes, frozen products are to be packed in a suitable packaging materials with appropriate packaging methods. The main requirements of effective packaging materials are low permeability at 0°F to moisture, oxygen and volatile odours, good mechanical strength, easy sealability, air tightness, flexibility and laminates being intact at temperatures as low as -29°C.

Different materials available for packaging of frozen foods are as follows:

- (i) derivatives of paper such as wax cartons,
- (ii) cellulose such as cellophane,
- (iii) polyethylene and polypropylene in plastics,
- (iv) Pliofilm in rubber, and
- (v) laminates.

### Newer Packages:

Among the new packaging materials, polyethylene films, coatings and laminations are most important. Polyethylene has better moisture barrier properties and low temperature properties than wax and wax coated papers and other materials used earlier except aluminium foil laminates. Its advantages are transparency, low cost, ease of opening and ease of reclosure.

The polyethylene coated polyester film bag became popular for "boil-in-bags" prepared vegetable package. Such bags are put in boiling water for a few minutes in order to bring the food to serving temperature. For frozen fruits in sugar syrup "thaw pack" is used which enables to thaw the ice crystals by immersing in boiling water.

The folding carton with hot melt polyvinylidene chloride coating is becoming popular due to its better barrier properties and convenience to seal the ends. The better body and stiffness of polypropylene, and its excellent clarity is preferred to the low density polyethylene for the bagged frozen vegetable market.

The use of foamed polystyrene sheeting or molded polystyrene foam as an outer container for a multipack of pouches of frozen vegetables or fruits would result in both an attractive and a functional package.

## FUTURE SCOPE AND CONCLUSION

The food processors should exploit the information available on the suitability of retort pouches and come forward to introduce various food products like fruit and vegetable products, meat and fish products, cereal products etc. packed in retort pouches and to explore the possibility of introducing such products on a commercial scale within the country and also create export potential. This will go a long way in replacing the traditional metal cans and glass bottles thereby reducing the cost of processed food products which are considered as luxury items in developing countries like India. This will be a boon to urban population where the vagaries of cooking can be minimised and the house-wife can be relieved from the routine drudgery of kitchen.

Aseptic packaging of fruit juices and milk in unit packs for internal consumption and fruit pulps, fruit juice concentrates, tomato puree and paste has been introduced recently by a few leading food processing factories in the country. Gradually the trend is increasing and this will be a boon for the exporters of such products and also to avoid seasonal glut of raw materials and to utilize the aseptically preserved products for the preparation of other finished products during off season in the country. However, the problems relating to colour deterioration, flavour loss and accidental puncturing of packaging materials have to be looked into to make it more popular.

There is a good scope for the introduction of frozen foods which are packed in a suitable flexible packaging material especially in urban areas. Frozen fresh fruits and vegetables or their semi processed products, meat and fish products can become popular due to the retention of quality and the nutrients in the products better than other processed food products.

## REFERENCES

1. Lampi, R.A., Flexible Packaging for thermo processed foods., *Advances in Food Research*, 1977, 23, 305.
2. Bhowmick, S.R., Shweta, T., A method for thermal process evaluation of conduction heated foods in retortable pouches, *Jr. of Food Sci.*, 1987, 52(1), 202.
3. Packages for heat processed foods, *Food Tech.*, 1955, 19(9), 236.
4. Davis, R.G., Flexible packages for processed foods, *Modern Packaging*, 1959, 33(1), 145.
5. Raja shekar, N, Retort pouches for processed food products, *Dissemination, C.F.T.R.I., Mysore (India)*, 1987, 38.
6. Schoch, W., Aseptic Packaging, *Tappi Journal*, 1984 (Sept.), 56;
7. Anon, Development in Food Packaging, *Food Technology Overview*, II International Food Convention, Association of Food Scientists and Technologists, India, February, 1988, 165.



8. Kumar, K.R., Aseptic packaging materials and package forms, Indian Food Industry, 1984, 3(4), 95.
9. Anon, Frozen products based on fruits and vegetables, Food Technology overview, II International Food Convention, Association of Food Scientists and Technologists, India, Feb. 1988, 51.
10. Sacharow, S., Griffin, R.C., Principles of Food Packaging, Second Edn., 1964, AVI Publishing Company, West Port, Connecticut, 259.

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## Raw Materials

Nil.

## Storage and Infestation Control

### 1 Cool storage for fruits and vegetables

One effective method of preserving fresh produce after harvest is maintaining low temperature and high humidity. Mechanical refrigeration requires a high input of energy and is expensive. So it is necessary to devise means by which the storage temperature can be reduced without using too much energy.

Based on the principle of evaporative cooling zero energy cool chambers have been developed for short term storage of fruits and vegetables. The raw materials required for construction are brick river-bed sand bamboo khaskhas gunny bags etc. Water can be drawn from taps tubewells, handpumps or ponds.

The floor of the storage space is made with a single layer of bricks. The side walls are built with a double layer leaving a space of three inches between the bricks which is filled with river bed sand. The top cover of the storage space is made with khaskhas/gunny bags in a bamboo structure. It requires 400 bricks and 10 bags of riverbed sand to hold about a quintal of fruits and vegetables.

#### Complete wetting

After construction, the bricks sand and top cover of the cool chamber are wetted (saturated) by sprinkling water. Actual storage of fruits and vegetables should be undertaken only when the cool chambers are completely wet. Once this is done sprinkling water once in the morning and evening is enough to maintain the temperature and humidity.

An interesting feature of the cool chamber is that the fluctuation of maximum and minimum temperature inside is not much (about 2.3 C) compared to the outside and more so in summer. The relative humidity of the chamber is maintained above 90 per cent throughout the year even when maximum humidity outside falls alarmingly.



Storage life of fruits and vegetables increases when they are kept in the cool chamber immediately after harvest. Ber, mango grapes sapota, sweet orange and vegetables such as palak, methi lettuce, okra cauliflower, peas, beetroot carrot and cucumber can be retained for a reasonable duration compared to ambient conditions before they are sent to the local markets.  
(The Hindu 27 December 1989, 24)

## 2 All purpose food storage bag

Food in the zippered Microfreeze Bag can be frozen refrigerated boiled and microwaved according to its manufacturer. Consisting of three co-extruded layers of tough temperature resistant polyethylene and nylon, it is said to offer excellent barrier properties. Featuring a patented shape this multipurpose bag can stand up for easy stacking and filling.

For further information write to: Vinmar Impex, Inc 15600 Drummet Blvd Ste 570 Houston, Texas 77032 U.S.A.  
(Industrial Products Finder 18(4) 1990 95)

## 3 Fully insulated chiller for fresh vegetables

Versatile and fully insulated, the Arctic Rain Hydrochiller can be custom designed for each specific cooling need of vegetable packing and processing operations. Built to save energy, the combination water chiller and hydrocooler rapidly removes field heat from vegetables. This ability reduces the respiration rate and greatly prolongs shipping life and quality of vegetables.

For more details write to: Semco Manufacturing Co. P.O. Box H, Pharr, Texas 78577 U.S.A.  
(Chemical Products Finder 8(7), 1989, 149)

## 4 Yeast coating of vegetable and fruits

Scientists at Israel's Agricultural Research Organization (ARO) near Tel Aviv have isolated a form of natural yeast that occurs in nature on the skin of citrus fruit protecting it against fungi. The yeast has already been produced in large quantities, patented and successfully applied to a consignment of tomatoes and cucumbers exported to Europe.

Israeli experiments show that 96% of produce stays fresh after treatment with this yeast, reports Dr. Edo Chalutz of the ARO Institute for Technology and Storage of Agricultural Products. The yeast does not affect taste and as it occurs in large quantities in certain cheeses.

Dr. Chalutz envisages a situation whereby a dipping coating process is built into all fruit and vegetables packing stations. Israel also hopes to sell laboratory made yeast to farmers in Africa and America who export their fresh winter produce to Europe.  
(Chemical Weekly 35(18), 1990, 82)

## 5 Natural scent used to trap insects

Pheromones a natural sexual scent and a patented controlled-release membrane are combined in the Biolure Insect Trap to manage insects. This nontoxic method safely keeps a wide variety of insects including gypsy moths and fruit flies from infesting row crops orchards and stored food in warehouses. Long lasting and economical this trap can be used in areas with infestations in order to reduce overall spraying.

For further information write to: Consep Membranes Inc 213 SW Columbia St. Bend Oregon 97702 U.S.A.  
(Industrial Products Finder 18(2) 1989, 44)

## Food Additives

Nil.

## Processes

Nil.

## Byproducts and Waste Utilization

### 6 Alcohol from damaged grains

Punjab will have the country's first high quality alcohol plant by 1991 based on damaged foodgrains reports PTI. The project which will be completed by March 1991 will provide direct employment to about 300 persons and indirect employment to about 5,000 persons in Punjab.

The State Financial Commissioner Development Mr. A.S. Pooni said that about 50,000 tonnes of damaged foodgrain was available in the state per annum. Mr. Vijay Malliya Chairman of the private company assisting the Punjab Agro Industries in setting up the plant claimed that the new distillery would be producing the finest quality of alcohol spirit comparable in quality with the best available in the world.  
(Chemical Weekly 35(14), 1989, 56)



## 7 Edible oil from fungi

Researchers at the Defence Food Research Laboratory (DFRL) in Mysore, Karnataka, have identified a species of fungi as a potential source of edible oil. The oil synthesised by the fungus, *Fusarium pallidosporium*, resembles olive oil in its chemical composition.

The DFRL researchers have screened nearly 20 species of fungi over the past two years in a programme to look for microorganisms as an alternative to seeds in the production of fats and oils.

Under optimum conditions, the oil yield from *Fusarium pallidosporium* is nearly 38 per cent, which compares very well with the oil output from various oil-producing seeds. The oil available from groundnut is about 45 per cent, while the oil palm, the coconut and the soyabean each have yields less than 20 per cent of the seed mass.

The DFRL team led by Director Dr. R. Sankaran has also developed a rapid and simple staining technique to detect the onset, accumulation and termination of oil synthesis in the fungal mycelium.

The measurements done through this technique are as accurate as those done through conventional gravimetric measurements. But while gravimetric measurements take 12 hours and involve harvesting, drying and extraction of the fungal mycelium, the new colorimetric test takes only about 30 minutes.  
(Chemical Weekly 35(15), 1989, 87)

## 8 Caffeine from Tea Waste

The Regional Research Laboratory, Jorhat has developed a process for extraction of caffeine from tea waste. The waste is cleaned and boiled with lime liquor bringing the caffeine in aqueous phase. Filtrate is then extracted counter currently with benzene and the extract is evaporated to recover benzene for reuse. Caffeine thus obtained is dissolved in water and subjected to crystallisation to get pure caffeine. The yield is about 1.5 - 2% by weight of the tea leaves. The decaffeinated tea can be processed to produce boards and other products. Conventional machinery used for solvent extraction of oilseeds can be adapted with slight modifications for continuous extraction of caffeine by this process.  
(Documentation Bulletin 77, 1989, 17)

## 9 Turning potato waste into biodegradable plastics

A process that biologically converts food processing wastes into lactic acid, then uses the lactic acid to make environmentally safe bio- and photo-degradable plastics has been developed by the Argonne National Laboratories.

According to the journal "Chemical Engineering", starch (from sources such as potato waste or cheese whey) is enzymatically hydrolysed to glucose. The glucose and other hydrolysis products are

subsequently fermented by bacteria that produce lactic acid which is continuously recovered, concentrated and further purified into a polymer-grade product.

In a related development, scientists at the Japanese Government Industrial Research Institute at Shikoku have just developed a new biodegradable plastic sheet made from a combination of polysaccharides - mainly cellulose derivatives and chitinous substances, the journal said.

The scientists make the material by diluting homogenised cellulose to form an aqueous suspension, and dissolving chitosan in a one percent acetic acid aqueous solution.

After sufficient mixing, and degassing under reduced pressure to remove trapped air bubbles, this solution is put into a dish, then dried for 15 h at 70 C in a forced-convection oven. The resulting translucent sheet is approximately 60-80 micro metres thick and contains 320 mg of cellulose, it said.

In tests, a corn seed was planted in a pot of this sheet material, and the pot was partially buried in soil. After 75 days that portion of the pot that was in the soil had decomposed completely allowing the roots of the corn plant to extend freely.  
(P.T.I. Science Service 9(1) 1990 14)

## Processed Products

-Nil-

## Equipment and Machinery

### 10 Programmable liquid filling system

Described as accurate yet low-cost, the EF-100 Series Liquid Filler fills containers of all shapes and sizes. Its features include a programmable microprocessor control, compact design, and easy operation and cleaning. The instrument can fill any flowable liquid from millilitres to gallons with an accuracy to  $\pm 0.5\%$  or better. Various available options allow users in food, chemical, packaging, and cosmetic industries to customise the filler to specific requirements.

For further information write to: Adtech, Inc P.O. Box 135, Rte 113 and Mensch Rd, Skippack, Pennsylvania 19474, U.S.A.  
(Industrial Products Finder Annual 1989, 125)



## 11 Rotary powder filling machines

Autopack England offers semi-automatic and automatic rotary powder filling machines having filling speeds of 25 to 100 fills/minute. These machines can handle powder products like milk powder salts spices talcum powder and other free flowing and non-free flowing powder products. Autopack also offers semiautomatic and automatic liquid filling lines from 100 cc to 200 litres; and multi head selective weigher for frozen foods vegetables confectionery dry foods snacks nuts, biscuits etc. Product is filled by weight with the help of microprocessor based control systems. Linear weighing machines are also offered with vibratory feeders.

For more details write to: Panpack Marketing, Panchal House, P.B. No.48, Station Road, Anand, Gujarat 388 001.  
(Chemical Products Finder 8(7), 1989, 131)

## 12 Machines seals round containers

The Dixie Double Seamer closes round tin, aluminium, composite, and plastic containers up to 15.9 cm in diameter. Available in atmospheric, vacuum or gassing models, this machine seals lightweight metal tops at a rate of 2-8/min. It comes in a table version or a floor unit to meet the individual needs of food and beverage processors and low-volume packagers.

For more details write to: Dixie Canner Equipment Co., P.O. Box 1348, Athens, Georgia 30606-1348, U.S.A.  
(Chemical Products Finder 8(7), 1989, 149)

## 13 Form-fill-seal machine

The latest technological breakthrough achieved by Nichrome is the development of the electronic weigh-filler. The Weighmaster specially designed for such situations of dynamic weighing, is capable of handling upto 20 weight fills per minute and is compatible with form-fill-seal technology. This highly sensitive electromagnetic system is designed to give up to 0.01% fill accuracy. Thus in the case of high value items such as cashewnuts, for example, where compounded losses due to filling inaccuracies can be considerable the Weighmaster is a very useful and cost-effective piece equipment. In the case of high value products such as engine oils, perfumes and expensive foodstuffs where inaccuracy on either side can result in serious losses to the supplier or to the consumer, Nichrome's checkweighing device can be of great value. Here every package is weighed for accuracy and defectives are sorted out. The device can be interfaced with a real-time computer which can generate day-to-day productivity records. The checkweigher can also be used as a tare weight calibration system when linked to a weigh-filler through a feedback loop. Automated container filling lines find use in certain specific areas of application such as foodstuffs hazardous materials and high-value products where precision performance is a must and the incidence of human error has to be minimised.



For more details write to: Nichrome Metal Works, 46 Dr. Ambedkar Road Near Sangam Bridge Pune Maharashtra 411 001.  
(Chemical Products Finder 8(7), 1989, 34)

#### 14 Food weighing and packaging system

Manufactured by Ross Industries Inc. USA the rugged sanitary stainless steel multiple-selective, combination Weighing and Packaging System automatically packages pasta vegetables meat candy and other foods. The weigher deposits exact proportions into the bagger's form tooling, so bags are made only when needed. A powerful IBM compatible computer makes the system adapt to variations in upstream production and product flow. It also controls excessive give-away overfilled scales and forced dumps.

For further information write to: Ross Industries, Inc Rte 610 Midland, Virginia 22728, U.S.A.  
(Industrial Products Finder Annual 1989, 253)

#### 15 Strip packing machine

Acufil Model 2TR Strip Packing Machine is best suited for packing of supari, peppermint, and tablets in heat sealable laminates. It has an operating speed of 270 to 300 pouches per minute in one gram range. This machine is of proven design and functions without any fault. The sealing temperature is controlled electronically totally eliminating paper wastage. The power requirement is 1 HP and 1,000 watts. Acufil also manufactures automatic, conveyor operated hot air sachet sealing machines, and powder filling machines.

For further information write to: Acufil Machines 23 V N Industrial Estate, Peelamedu, Coimbatore, Tamil Nadu 641 004.  
(Industrial Products Finder 18(4), 1990, 163)

#### 16 Tray driers

Melco offers 12, 24, 48 and 96-tray driers for use in chemical, pharmaceutical, dyestuff, food, confectionery, sericulture, and baking ovens for powder/Tuflon coating. Standard temperature ranges are 100 C, 200 C and 300 C. The external frame is made of 10 gauge fabricated MS angles. The external cabinet and internal work chamber is covered with heavy gauge CRCA sheets. A resin bonded good quality fibre-glass slab type insulation is provided between the external and internal walls. The insulation thickness varies from 50 to 75 mm depending upon the working temperature. Well balanced propeller type fans driven by motors manufactured by reputed companies with ISI mark are provided. Suitable filtered inlet and adjustable roof mounted exhaust ports are provided. Stainless steel U type sealed air heaters with ISI mark are provided for rapid heating and trouble free long life. A control panel complete with solid state digital indicating temperature controller, rotary main switch, separate HRC fuses for motor and heater circuits, overload relays with single phasing



preventer and indicating lamps are provided. A remote control panel for corrosive and hazardous atmosphere, trollies, trays and temperature recorders are optionally provided.

For more details write to: Moktall Electrical Co, C/G-8 Ram Girdhar Industrial Estate, Station Road, Vithalwadi, Dist Thane, Maharashtra 421 003.

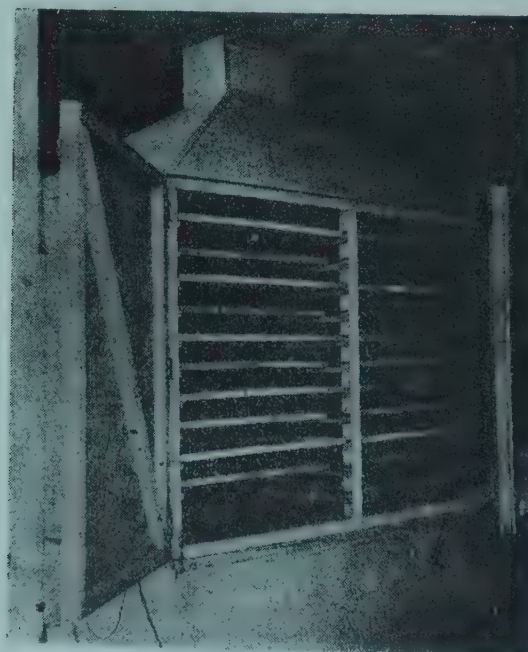
(Chemical Products Finder 8(7), 1989, 184)

## 17 Low-cost tray dryer for food products

The tray dryer (Figs 1 & 2) basically consists of a drying chamber and a plenum chamber. The frame of the plenum chamber is made of MS angle and flats and is covered with asbestos sheet on the sides and wire-mesh at the top. A burning-cum-heat exchanging unit is housed in the centre of the plenum chamber. The burning chamber is a GI sheet cylinder fitted with 6 pins for heat transfer. One end of the cylinder is open to take in fuel which is burnt in the centre, and other end is connected to a chimney having a butterfly valve for manual control of drying air temperature.

The drying chamber is made of soft-wood frame and plywood cover housing 20 wire-mesh trays of 90 x 120 cm size. An exhaust vent with adjustable opening is provided at the top.

*Fig. 1. The low-cost natural convection type tray dryer for food products.*



### Operation

The fuel (dry agricultural waste wood chips etc) is burnt in a welded wire-mesh tray in the centre of the burning chamber. Due to high temperature of flue gases, the drum and the fins get heated. This heat is transferred to surrounding air by radiation and convec-

tion. The hot air comes in contact with the wet material as it moves upward. The moisture laden air then escapes from the exhaust vent. This process creates a cycle of natural convection of air through the drying trays. The material is stirred frequently and position of the trays is interchanged to achieve uniform drying.

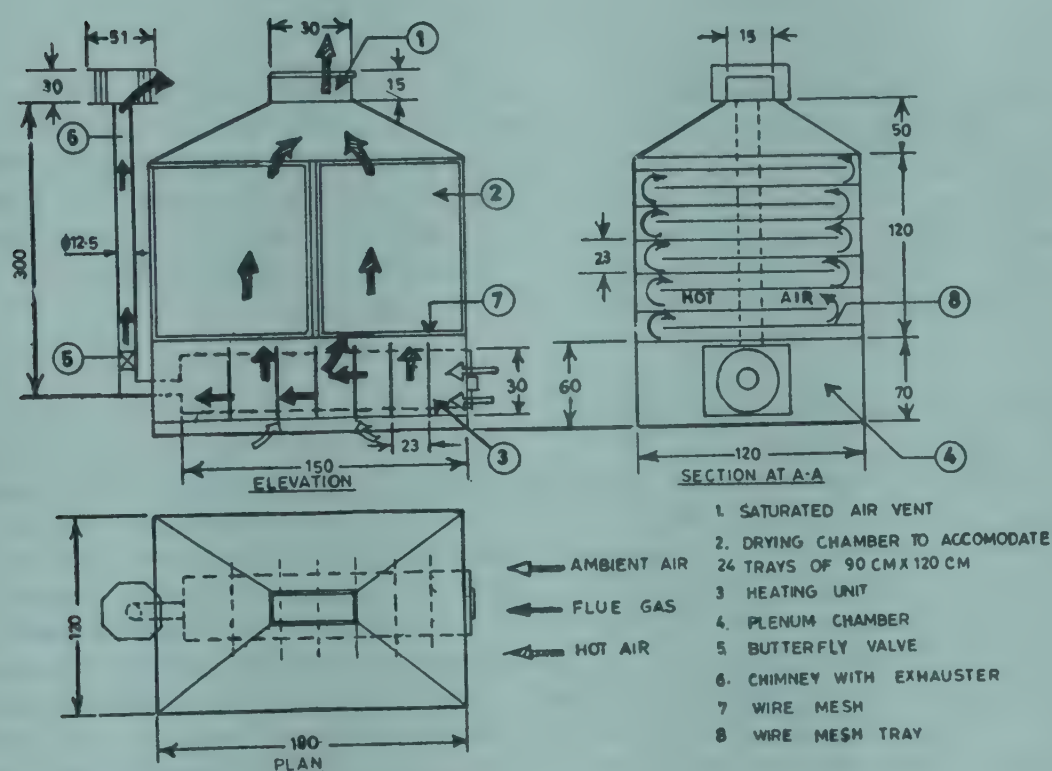


Fig. 2. Natural convection type tray dryer for soybean.

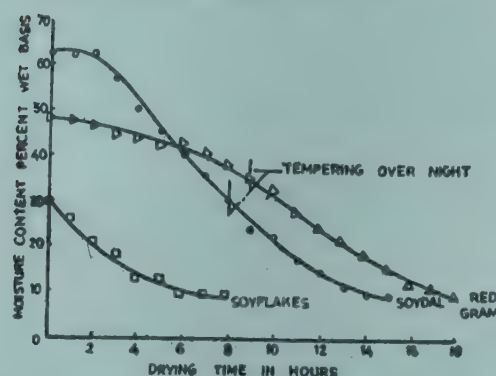
### Performance

The dryer takes a load of 100 kg of wet material per batch. Its fuel requirement is about 3 kg wood-chips/hr to maintain no-load temperature of about 50 C.

Blanched soyabean and soaked redgram were dried in this dryer. The time required for drying redgram (49% to 9.4% mc), soydal (63% to 8% mc) and soyflakes (30% to 10%) was 18, 15 and 6 hours respectively. The variation of moisture content with time for the above products is shown in Fig. 3.



Fig. 3. Variation of moisture content with time for redgram, soyflakes and soydal in tray dryer.



The dryer is estimated to cost Rs. 5,700. The cost of drying works out to Re.0.25/kg, which compares well with sun-drying, not to mention drastic reduction in processing time and improved material quality. Being simple in construction it can be easily fabricated in a rural workshop by local artisans. And since it uses agricultural waste as fuel it is independent of weather and electrical power. (Invention Intelligence December 1989, 567-8)

## 18 Low temperature drying systems

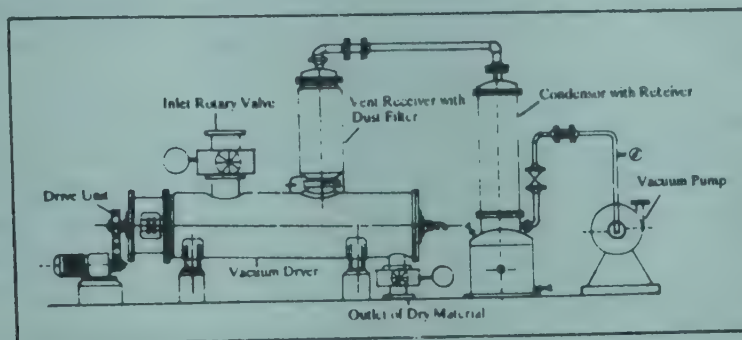
For products which are temperature sensitive drying at high temperature deteriorates their quality. In such instances the solution lies in surrounding the products with dry air without the risk of product spoilage. Dry-Air specialises in such types of systems for drying at temperature below 75 F. These dehumidifiers speed up product drying by continuously removing moisture from the surrounding air by a process of physical adsorption where the adsorbent used is a desiccant. The units are custom designed for specific requirements. They are available in different models with different drying capacities. Dry-Air dehumidifiers find applications in various industries where low temperature drying is required like drying of cocoa gelatine yeast coffee powder flour, starches katha onions in processing powdery foods like soft drink concentrates milk powder, sugar in packaging and storage of biscuits wafers snacks and in breweries and distilleries to prevent mould and mildew formation in hop storages yeast rooms, fermentation and kegging areas.

For further information write to: Arctic India Sales 20 Rajpur Road Delhi 110 054.  
(Industrial Products Finder Annual 1989, 413)

## 19 Continuous vacuum dryer

Atomic Vacuum Company designs and manufactures horizontal agitated vacuum dryers suitable for continuous process. As a better alternative to conventional batch type dryers this new dryer can take feed continuously from atmospheric pressure to vacuum and effect continuous delivery of dried products from vacuum to atmosphere. Other features include: advanced design of the dryer low temperature drying to suit heat sensitive products blade design can be varied to

suit the characteristics of products handled, more compact than batch type dryers, and ideal for mass production at a comparatively limited space and time. Nominal capacities offered are from 5 kg/hr up to 1,000 kg/hr. This equipment is also suitable as a continuous reactor-cum-dryer.



For more details write to: Atomic Vacuum Company, 39/467 Shell Colony, Chembur, Bombay - 400 071.  
(Chemical Products Finder 8(6), 1989, 137)

## 20 Double-cone vacuum driers

Mech-Tech manufactures Double-cone vacuum driers for fast and efficient drying of a wide range of chemical, pharmaceutical and food products. The double-conical vessel with an external jacket for heating ensures direct contact between the material and heated surface. The vessel rotates on its axis resulting in tumbling action of the product inside. This constant movement of the product increases the heat transfer between the heated surface and the product. A high vacuum is maintained throughout the drying process to facilitate full recovery of solvent vapours. Salient features are: uniform temperature throughout the batch eliminates caking totally sealed and protected from dust and contamination; quick loading and unloading; and low temperature drying retains product characteristics. The driers are available in capacities ranging from 250 to 2,500 litres.

For further information write to: Mech-Tech PB No. 9019, SCB Complex WE Highway Goregaon (E) Bombay-400 063.  
(Industrial Products Finder 18(4) 1990, 185)

## 21 Sweet making equipment

Navayug Industrials offers equipment for making sweets. It consists of a hemispherical vessel rotating at a speed of 15 to 20 RPM. The vessel is provided with fixed or oscillating scrapers. Heating is by a direct flame. A variety of stirrers like petal stirrers and high speed stirrers are offered. These stirrers are used for mixing homogenising and kneading. Material of construction of the vessel is SS 304/SS 316. The vessel is available in sizes from 100 litres to 10,000 litres.

For further information write to: Navayug Industrials, 23 Govt Industrial Estate Kandivli (W), Bombay 400 067.  
(Industrial Products Finder 18(2), 1989, 15)



## Heavy duty kneading machine

FE manufactures heavy duty Sigma Kneading Machine which is specially designed for mixing masticating breaking down dispersing wetting down and homogenising viscous materials of the strongest consistency used in the chemical dyestuff food paint and adhesives industries. The kneading blades are casted in one piece, and is of duplex type so as to avoid any dead spots which on other blade types accumulate unwetted solids and cause non-uniformity of product. Both blades rotate in opposite direction towards one another and in different speeds having ratio 1:2 or any ratio that the user requires so as to ensure intensive lifting and homogenising of the material. Heavy stuffing boxes are provided with roller bearings phosphor bronze bushing and Teflon impregnated seals to ensure smooth working and longer life of machine. The entire container can be tilted from horizontal to vertical position up to an angle of  $110^\circ$  manually electrically, or hydraulically as desired. Bottom discharge can also be provided to facilitate quick discharge.

For more details write to: Frigmaires Engineers Bharat House  
2nd Floor 104 Bombay Samachar Marg Fort Bombay 400 023.  
(Chemical Products Finder 8(7) 1989 161)

## Improved dough mixer

The Central Institute of Agricultural Engineering Bhopal has come up with an improved electrical dough mixer that can make homogenous dough in far less time than current mixers.

The new dough mixer is a simple structure that can be fabricated locally and is of use to small-scale baking units. It consists of a vertical angle iron frame with a single steel arm. The arm rotates in a stationary steel cylinder with the help of an eccentric disc. A gear box attached to the main shaft on the top of the machine has ordinary and level gears of different sizes. The gear system is enclosed by a metallic cover to avoid contamination by lubricants or any other unwanted material in the final product.

A two-horse-power electric motor, which is connected to the main shaft through a belt and pulley, generates a vertical motion which is converted into horizontal motion by the level gear and transmitted to the steel arm through the eccentric disc.

The two-way motion developed by the rotating steel arm which rotates both along its own axis and that of the central shaft with the help of the eccentric disc, helps in homogenous mixing of the dough.

The machine can mix three kg of flour in three minutes at an arm speed of 600 rounds per minute. The single arm power-operated dough mixer is 1000 mm long 840 wide and 519 mm high and weighs 66.5 kg with the electric motor, says a report in the Indian Journal of Agricultural Science

(P.T.I. Science Service 9(1) 1990, 5)

## 24 Double arm mixer-cum kneader

The Fabdecon double arm mixer-cum-kneader is a highly engineered machine used for mixing and kneading high viscous and pasty material. It is available in capacities ranging from 10 to 2,000 litres. The mixing action is a combination of bulk movement, smearing, stretching, folding, dividing and recombining as the material is pulled and squeezed against blades and walls of the container. The mixer has wide applications in diverse industries like confectionery (bread, biscuit chewing-gum chocolates) etc. The mixer is available in mild steel stainless steels of all grades, alloy steels, Hastelloy and abrasion-resistant materials of construction. To enhance scope, options offered include vacuum design, jacketed trough for heating or cooling, variable speed drives and different blade designs. The mixer incorporates efficient sealing system to avoid extraneous material like bearing lubricants, etc from leaking into the mixing zone. Also special seals can be provided for high vacuum application and for abrasive material mixing. Discharging of material is effected by tilting the container manually, mechanically or hydraulically, or through bottom valve, operated manually/pneumatically; or through an integrally incorporated extruder. Fabdecon offers right combination of features to provide a mixer suited to individual application and also incorporate electrical and mechanical interlocks to ensure accident-free operation.

For more details write to: Fabdecon Engineers 138 Damji Shamji Industrial Complex, Off Mahakali Caves Road, Andheri (East) Bombay 400 093.  
(Chemical Products Finder 8(7) 1989, 161)

## 25 Sigma mixer (kneader)

PEC offers a heavy duty, double arm mixer (kneader) designed for uniform mixing and kneading heavy viscosity materials such as stiff pastes, different kinds of dough, adhesive polyester premixes, flush colours and brake lining compounds. The tangential action of mixing and kneading is thoroughly obtained by Z shaped spiral kneading blades having very close clearance to the vessel walls, thus the kneading material does not stick to the inner walls of trough. Blade is manufactured from graded cast steel/stainless steel. Container tilting can be manual or motorised and, if desired, discharge facility at the bottom can be provided. The mixing trough can be jacketed and hydraulically tested for heating and cooling purpose. Vacuum facilities can also be provided. User areas include chemical, pharmaceutical, confectionery, food products, paapad dough. The machines are available in working capacities ranging from 4.5 to 1,200 litres, in mild or stainless steel construction.

For further information write to: Paresh Engineering Co., 74-B, Sanjay Building No.5, Mittal Industrial Estate, M Vasanji Road, Marol Naka, Andheri (E), Bombay 400 059.  
(Industrial Products Finder 18(4), 1990, 24)



## 26 Grinder processes grains and cassava

Farmers and food processors can grind all types of grain and cassava for both human and animal food with the portable Adeem 500 grinder. Made of stainless steel plate, it has interchangeable screens. Capable of processing 250-1,000 kg/h, this fuel efficient, easy to operate machine can be powered by electricity or gas.

For further information write to: Adeemera Enterprises, Inc., P.O. Box 266, 82, Oakbrier Ct, Penfield, New York 14526, U.S.A. (Industrial Products Finder Annual 1989, 85)

## 27 Quick freezing for food processing plants

Described as easy to operate, the RECO Vertical Plate Freezer Model VPF allows rapid loading, freezing, and unloading of fish, offal, vegetables, fruits, and ground meat. The equipment is generally used for products to be further processed later. The vertical aluminium plate freezing process is said to provide excellent heat transfer and low cost quick freezing of blocks of product for containerisation and palletization. Unlike material frozen in cartons, the uniformly thick and flat blocks can be stacked securely.

For further information write to: Refrigeration Engineering Corporation, 5680 E Houston St., San Antonio, Texas 78220, U.S.A. (Industrial Products Finder Annual 1989, 523)

## 28 Fruit mill (fruit shredder)

The Temp-X multi-purpose machine is suitable for fruit, dairy and food industries. It can be used for grape cutting in beverage industries; tomato shredding for sauce chatni plants; guava cutting for pulp making; onion shredding for chatni preparation; casein grinding and shredding either wet or dry in dairy industry; dry fruit cutting to standard pieces in ice-cream plant; and groundnut shredding to fluffy mass for making sweets. With flexible attachment it is possible to shred coconut, potato, cashew nuts, cake and the like. It is also used for mixing dry powder to cereals and tea ingredients. The machine is portable, motorised 1HP x 900 RPM, mounted on a table. It has top-feed and bottom-discharge chutes. Parts coming in contact are from SS 304.

For more details write to: Shriram Temp-X-Changers (India) 991/2/A, GIDC Opp Makarpura Bus Depot, Vadodara, Gujarat 390 010. (Chemical Products Finder 8(6), 1989, 138)

## 29 Automatic internal lacquering machine for food and beverage cans

The Automatic Spraying Machine HIL-15 developed by Sprimag Spritzmaschinenbau GmbH of West Germany internally coats up to 1,000 beverage cans per minute with a uniform and pore-free layer of protective lacquer. The machine works continuously at a constant pace

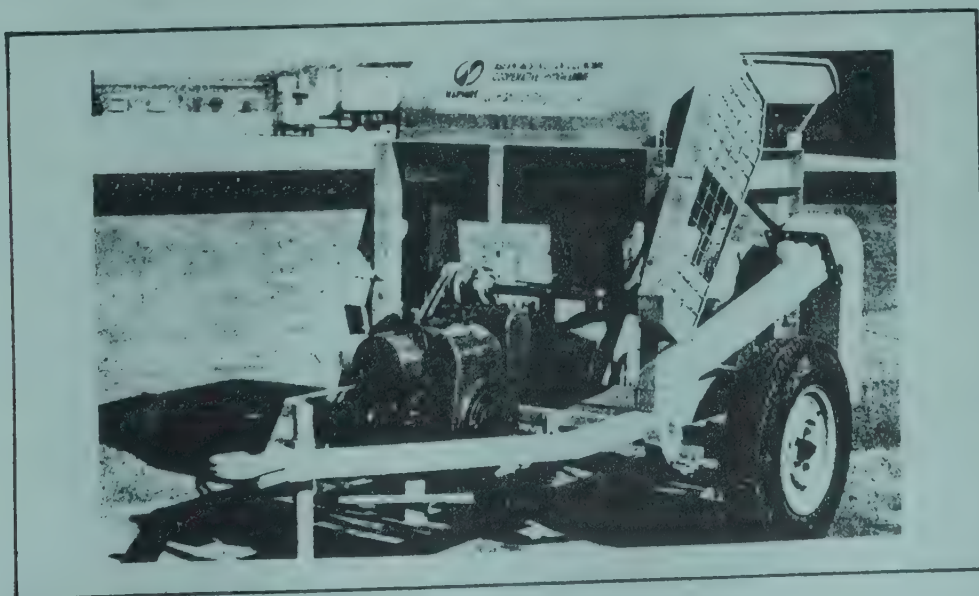
ensuring gentle and damage-free handling of food and beverage cans. The HIL-15 sprays through 6 rotating but stationary airless hot spray units in constant spraying position, each with 2 to 3 guns spraying simultaneously with minimum back pressure. The cans are rotated while spraying for uniform coating thickness. Lacquer is kept in circulation in the spray units to prevent premature jet clogging. Lacquer overspray is drawn off and filtered dry. Filters can be exchanged even during operation. The HIL-15 is usually equipped with a drying furnace and thermal waste air cleaning as well as a cooling zone and if necessary conveyerisation up to a storage point. It can also be used for modern environment-friendly water-based lacquers. The machine can be imported against Actual User's Import Licence.

For more details write to: Industrial Plants and Equipment Co.  
434 Hind Rajasthan Bldg, D. Phalke Road, Dadar, Bombay 400 014.  
(Chemical Products Finder 8(6), 1989, 136)

### 30 Improved mobile corn sheller

In response to the need to reduce shelling losses due to technical deficiencies an improved mobile corn sheller has just been developed by the National Post-Harvest Institute for Research and Extension (NAPHIRE) in the Philippines under the ASEAN-Australia Economic Cooperation Programme.

Before the improved design was made, three types of existing shellers - the crushing non-crushing and semi-crushing types - were tested and evaluated to determine their operational deficiencies. The design of the improved mobile maize sheller comes from the results of the performance testing and evaluation conducted.





Major improvements include modification in the power transmission system of the existing design resulting in a more compact design for better mobility; baffles and rasps on the shelling concave to increase shelling recovery; and application of suction air to separate light impurities from the shelled grains. All these modifications make the new machine more efficient and easy to operate and maintain.

This prototype was field tested in Isabela, Philippines. Results from the evaluation revealed that the improved machine performs better than existing commercial shellers. It obtained the highest efficiency of 97.11% lowest mean unshelled loss of 0.14%; lowest mean damaged grain of 2.75% and the lowest mean impurities of 0.79% among the crushing type sheller when shelling 22-35% moisture content corn.

Considering the losses due to shelling which in the case of the Philippines in 1986 was estimated at 17,766.75 metric tons equivalent to US \$ 5.14m, savings through the use of the new improved corn sheller could result in millions of dollars.

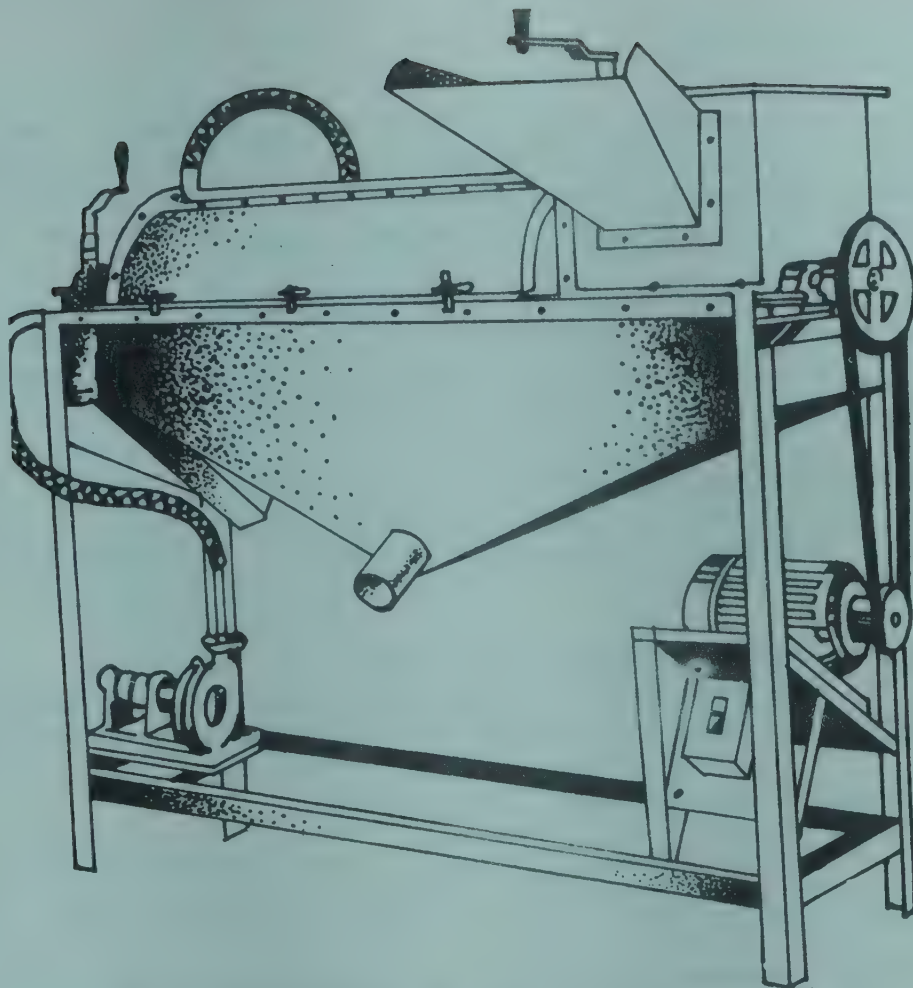
For details contact: National Post-Harvest Institute for Research and Extension (NAPHIRE), Munoz, Nueva Ecija, Philippines. (Asia-Pacific Tech Monitor July-August 1989, 21-22)

### Vegetable seed extractor

An axial-flow vegetable seed extracting machine based on the design developed by the College of Agricultural Engineering Punjab Agricultural University in Ludhiana, India, is now commercially fabricated by a local manufacturer.

Ripe fruits of various vegetables like tomato brinjal (aubergine or eggplant) chillies, cucumber squash-melon watermelon summer squash etc. are crushed by the fast revolving knives and fall through the concave screen.

Three interconnected water spraying pipes with holes running along the length of the rotor have been provided. A small centrifugal pump delivers water into the spraying pipes out of which the water come in the form of jets.



Axial-flow vegetable seed extracting machine.

The machine is operated by a 2 hp electric motor. A feed regulating gate prevents clogging of the machine. Similarly a pulp size regulating gate controls the size and flow of the pulp ejected from the machine.

As the ripe fruits are crushed by the fast rotating blades mounted on the rotor the water jets wash out the seeds and the crushed pulp is ejected from the seed outlet. The seeds are retained on a fine screen placed over the drum while water passes through.

For convenience, the machine could be best installed near a tube well or a water tank at sufficient height so that water can be fed directly into the crushing chamber. If enough pressure is available one may connect the spraying pipes to the water source; in this case there is no need to run the pump.

It is essential that sufficient water is available for smooth operation of the machine.

For details, contact: National Agro Industries Link Road  
Industrial Area-A Opp. Transport Nagar Ludhiana-141003 Punjab  
India.

(Asia-Pacific Tech Monitor July-August 1989, 21)



## 32 New device to chip tapioca

A mechanical chipper for tapioca has been developed by the Department of Agricultural Processing of TNAU. Chipping and drying of tapioca will prevent deterioration of its root like decolouration and decay after harvest within a short period of one week.

At present, the tuber is sliced manually resulting in waste of time besides being inefficient. It is also a tedious operation. The new machine is a vertical type motorised chipping gadget suitable for chipping tapioca, potato, carrot and radish.

A mechanised tapioca peeler run by one HP motor has also been developed. At present, peeling is done manually by women-folk with the aid of sharp-edged knives which is a time-consuming operation besides resulting in loss of starch and lower output.

The machine has a capacity of 950 kg an hour with a peeling efficiency of 83 per cent. Starch loss will be only about five per cent. The machine will save the cost of operation to the extent of 87 per cent.  
(Financial Express 23 January 1990, 8)

## 33 An end to grit picking

A small but essential stage in processing cereals has been simplified. The Central Institute of Agricultural Engineering, India, has designed, developed and tested a hand-operated grain cleaner for cereals and pulses. The cleaner (Figure 1) is made of mild steel and contains two screens with different sized meshes. Separation takes place on the basis of the difference between the size of the foreign matter and of grain.

The cleaner is suspended from an elevated point by four ropes. The screens are interchangeable according to the type of grain. Grain is fed into the cleaner in batches of about 5-10 kg, and the cleaner is swung to and fro like a cradle by the operator until all the grain is screened. The cleaned grain is collected on the bottom sieve, and this can be emptied by pulling a spring-loaded shutter.

Impurities of a larger size, such as stubble, chaff, etc., are retained on the top sieve and can be removed easily. Below the bottom sieve dust, dirt, broken pieces and shrivelled grain fall through during the operation and can be disposed of at intervals.

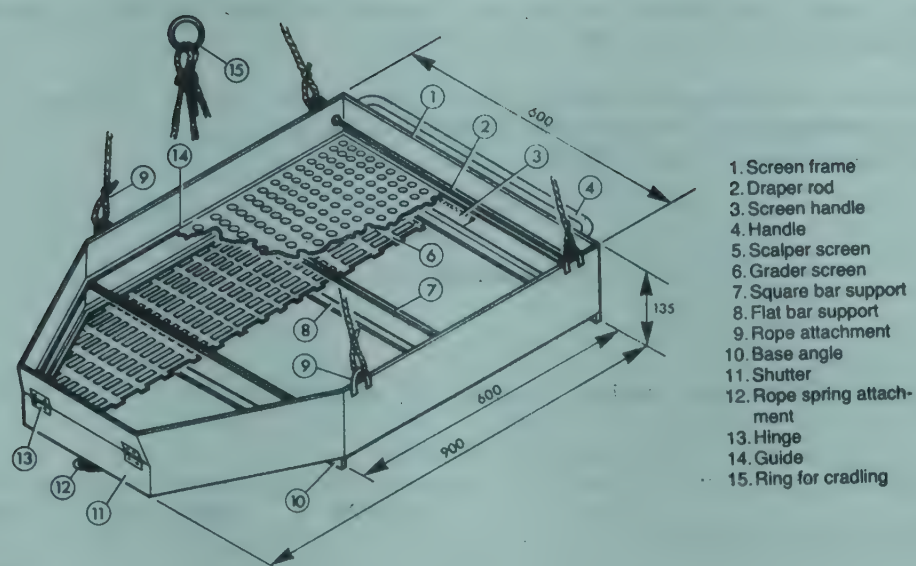


Figure 1. Hand-operated double-screen grain cleaner.

The weight of the grain cleaner is 14 kg and it can be manufactured for Rs.535 (Sterling 20). It is suitable for cleaning wheat, chick peas, soyabeans and other major cereals and pulses. One person can handle between 150 and 225 kg of grain per hour, depending on the type of grain to be cleaned.

More information about the double-screen grain cleaner is available from: Dr R.P. Kachru, Head, Post-harvest Engineering Division, Central Institute of Agricultural Engineering, GTB Complex, TT Nagar, Bhopal-462 003, India.  
(Appropriate Technology 16(3), 1989, 25)

### 34 Peeling machine

Producers of potato chips and other products from root vegetables have good news from Dornow Food Technology (DFT), West Germany. DFT has introduced a new peeling machine that peels without waste water.

The roller peeling machine is equipped with 5 to 14 peeling rollers, with an internal diameter of 500 to 1,500 mm. The machine has a peeling capacity of 0.5 to 10 tons of raw vegetables per hour.

With its facility of peeling without waste water the DFT claims that the machine will cut costs for waste disposal. The burden on the municipal waste water system will also be reduced and the peels could be recycled as animal feed, fertilizer etc.  
(Science Today December 1989 31)



## 35 Doughnut machine

The Donut Man Model 101 automatic doughnut machine can be used in bakeries and restaurants and at fairs to make up to 1,200 fresh miniature doughnuts in front of spectators.

For further information write to: American Food Lines, 9851 13th Ave N, Minneapolis, Minnesota 55441, U.S.A.  
(Industrial Products Finder 18(3), 1989, 162)

## Packaging

## 36 Consumption estimates for major packaging materials

(In metric tonnes)

Material	1973-74	1978-79	1982-83	1989-90	1994-95
Jute	-	-	-	135,500	-
(a) Hessian	538,985	594,300	694,000	-	-
(b) Sacking	109,245	120,900	114,000	-	-
Paper and paperboard	567,300	668,000	875,000	180,000	155,000*
(a) Cartons	138,400	167,000	219,800	-	-
(b) Corrugated board	92,000	133,000	175,000	-	-
(c) Bags/sacks	-	100,000	131,200	-	-
(d) Wrappers, labels & pouches	268,000	187,200	245,000	-	-
(e) Others	-	-	105,000	-	-
Black and galvanised plates	-	125,000	180,000	-	-
Tinplates	-	185,000	261,000	350,000	114,000*
Plastics (Thermoplastics)	61,440	84,400	118,100	698,000	349,000*
Aluminium foil	-	4,800	6,000	12,750	18,750*
(a) Aluminium cans (tonnes)	1,800	3,000	4,500	3,900	5,200
	(1975)	(1984)	(1989)		
(b) Aluminium collapsible tubes (tonnes)	2,800	4,000	6,000	-	-
	(1975)	(1984)	(1989)		
Glass bottles, etc.	-	-	400,000	600,000	300,457*
Cellophane	-	-	6,650	-	-

\* for packaging only

(Financial Express 26 December 1989, XII)

## Analysis

### 37 Salt analyser

Pocket Pal analyser from Presto-Tek can make quick and easy measurements of sodium chloride concentration up to 20%. It is suitable for use in the laboratory or at the process line. The SM-8 has two calibration modes: fixed, which is calibrated to reagent grade NaCl; and variable which can be calibrated to user's particular application.

For further information write to: Presto-Tek Corporation  
Instrument Divn, 4101 North Figueroa St, Los Angeles, CA 90065  
U.S.A.

(Industrial Products Finder Annual 1989, 629)

### 38 Microprocessor controlled moisture analysers

Computrac MAX-Series Moisture Analyser from Arizona Instruments Corporation, USA, accurately determines the moisture level in liquids or semi-solid samples in as fast as three minutes. The instrument automatically weighs and calculates the per cent moisture of solid and displays the results on large LED readout. Depending on the application, the instrument will have a display accuracy of 0.01%. MAX-50 is designed to determine the moisture levels down to 0.1%. It has a programmable heating range from 25 C to 225 C and samples size range from 1 to 20 g. A dual temperature program for faster heating on high moisture samples is also available. Based on a thermogravimetric principle, the instrument utilises computer technology to reduce test times and increase precision over standard vacuum ovens or convection oven drying procedures. The moisture is driven from the testing sample by heating it at a constant programable temperature and an electronic force balance records the weight loss over time and calculates the per cent moisture. The instrument is self calibrated and requires no operator adjustment. No pre-weighing of the sample is required. User areas include pharmaceutical, dyestuff, and food industries

For further information write to: Aimil Sales and Agencies Pvt Ltd, Malhotra House, Walchand Hirachand Marg Opposite GPO, Bombay 400 001.

(Industrial Products Finder Annual 1989, 95)



## Commercial Intelligence

## PRODUCTION (Raw Materials)

## 39 State-wise area and production of fruits in India (1986-87)

	Area in ha (thou)	Production in thou tonnes
Andhra Pradesh	325.32	3185.31
Arunachal Pradesh	9.62	22.33
Assam	41.58	550.74
Bihar	236.15	2450.00
Goa	74.80	43.80
Gujarat	81.80	1810.50
Haryana	22.26	116.66
Himachal Pradesh	135.25	400.51
Jammu and Kashmir	151.21	763.16
Karnataka	178.34	3110.49
Manipur	184.11	330.24
Meghalaya	66.99	894.53
Mizoram	94.98	1564.84
Nagaland	17.03	175.26
Orissa	25.98	175.61
Punjab	33.82	18.94
Rajasthan	3.24	5.88
Sikkim	132.33	1252.59
Tamil Nadu	56.82	489.80
Tripura	12.91	129.10
Uttar Pradesh	9.38	2.72
West Bengal	119.44	2311.90
Andaman and Nicobar Islands	34.73	277.72
Chandigarh	779.00	5320.00
Dadar and Nagar Haveli	108.52	1068.85
Delhi	2.67	21.08
Pondicherry	0.11	1.20
Lakshadweep	0.76	6.89
	0.63	4.15
	0.44	5.90
	0.11	1.97
Total	2940.23	25559.57

(Financial Express 26 December 1989, VIII)

## 40 State-wise area and production of vegetables

	Area in ha(thou)	Production in thou tonnes
Andhra Pradesh	79,330	9,56,184
Assam	92,797	3,84,961
Bihar	7,81,402	77,00,936
Gujarat	84,000	13,83,000
Haryana	40,500	4,05,000
Himachal Pradesh	16,400	56,000
Jammu and Kashmir	1,500	15,000
Karnataka	2,27,704	35,32,956
Kerala	2,19,905	33,50,708
Madhya Pradesh	1,35,916	13,98,114
Maharashtra	2,14,139	8,29,592
Manipur	51,734	94,760
Meghalaya	23,536	2,68,641
Nagaland	2,987.8	32,477.7
Orissa	6,85,000	57,10,060
Punjab	78,000	12,54,980
Rajasthan	59,093	1,71,369
Sikkim	8,950	56,200
Tamil Nadu	2,21,637	23,15,541
Tripura	25,250	2,10,500
Uttar Pradesh	7,72,096	1,00,45,000
West Bengal	4,10,485	39,64,617
Andaman and Nicobar Islands	2,700	16,200
Arunachal Pradesh	18,439	64,899
Dadar and Nagar Haveli	285	2,000
Delhi	46,920	6,10,900
Goa Daman and Diu	6,500	55,250
Mizoram	7,227	57,588
Pondicherry	709	12,039
Chandigarh	-	1,970
All-India	43,15,141.8	49,59,942.7

(Financial Express 26 December 1989, VIII)

## 41 Increase in production of oilseeds

Import of edible oilseeds has been considerably brought down due to several measures which had helped in increased production. The import has been only to the tune of less than 3.5 lakh tonnes this year as against 18.2 lakh tonnes during the oil year, November 1987 to October 1988.

According to the Indian Council of Agricultural Research (ICAR), the production of edible oilseeds has gone up by twofold to 18 million tonnes during 1988-89. The increase in production has been attributed to various measures taken by the ICAR.



As part of its strategy to boost production and reduce the imports the ICAR has evolved 40 new and hybrid varieties which have an yield potential of four times the national average under farm conditions. These include rapeseed and mustard varieties for late sowing conditions and varieties with resistance to white rust and suitable for salinity conditions

Since the setting up of the Technology Mission for Oilseeds in 1986 an Integrated approach to boost production has paid dividends in not only increased production but has also resulted in higher yield per hectare.

The per unit production registered an increase by 69 kg per hectare to 840 kg in the current year since 1984-85. Various technological inputs also resulted in the enhancement of production. (The Hindu 23 January 1990, 11)

#### Production (Industrial)

42 Processing and production of oils fats for the period April to November 1989

(Quantity in M.T.  
Amount in Rs.)

Commodity oilcake/ seed/bran	Production of S.E. oil				Production of extraction M.T.
	Processed M.T.	Edible M.T.	Industrial M.T.	Total M.T.	
Rice bran	1247685	79067	108185	187252	1046014
Sunflower oilcake	121900	12622	1593	14215	107393
Rapeseed oilcake	681015	48521	16992	65513	610951
Salseed	100342	3168	9584	12752	86567
Mango kernel	13431	—	1215	1215	11635
Mahua seed oilcake	27321	179	1947	2126	24396
Kokum seed oilcake	514	29	29	58	445
Kardi oilcake	24122	1378	523	1901	22296
Sesame seed oilcake	9347	481	265	746	8583
Nigerseed oilcake	1649	104	—	104	1479
Copra oilcake	31086	481	2230	2711	28876
Kusum seed	957	—	99	99	824

(The Economic Times 7 January 1990, 8)

## 43 Trends in production of certain selected processed foods

(Value in Rs. lakhs)

Name of the products	Accounting Unit	1975				1985			
		No. of units	Installed capacity	Production Qty.	Production Value	No. of units	Installed capacity	Production Qty.	Production Value
Biscuit	Tonnes	31	104,448	70,348	5,839	33	1,47,984	1,35,731	18,500
Confectionery	"	22	35,928	12,671	1,330	22	35,928	26,270	4,203
Bread	"	17	83,204	81,800	1,681	21	1,21,945	1,18,273	4,730
Soft drinks	Mill bottles	34	1,731	670	2,875	50	2,310	1,688	1,520
Malt extracts	Tonnes	2	4,800	2,278	131	5	13,060	6,705	516
Wearing food	"	-	-	6,500	975	3	10,300	4,910	1,230
High protein food	"	16	8,951	-	-	9	13,600	8,370	1,700
Starch	"	9	168,600	1,10,000	2,500	11	2,66,580	1,42,000	5,514
Dex monohydrates	"	2	30,600	10,000	450	6	34,200	27,000	2,200
Chocolate	"	5	4,410	1,800	376	6	8,497	7,140	2,700
Drinking chocolate	"	3	1,500	200	15	3	1,500	325	6,825
late	"	3	642	105	35	5	642	225	76
Cocoa powder	"	1	600	600	102	2	1,125	1,150	460
Cheese	"	-	-	-	-	1	3,000	114	37
Cocoa butter substitutes	"	31	97,867	26,000	1,001	32	1,07,867	54,000	-
Fruit and vegetable	"	10	29,578	26,321	4,034	18	62,478	50,133	17,045
Baby food	"	-	-	-	-	22	50,000	22,000	5,280
SMP	"	-	-	-	-	22	-	16,000	4,320
WMP	"	6	13,300	5,000	600	6	13,300	7,500	1,210
Condensed milk	KL	10	12,500	6,000	950	10	12,500	11,584	3,360
Butter	Tonnes	19	16,500	9,500	1,950	19	16,500	21,000	8,510
Ghee	"	9	20,418	15,000	2,550	9	20,988	24,000	7,929
Malted milk food	KL	7	9,490	4,200	395	8	10,895	10,500	11,666
Ice-cream	Tonnes	6	5,500	2,100	-	9	45,500	5,000	3,500
Fish	"	4	1,600	1,181	260	7	-	20,000	4,000
Meat products	"	-	-	-	-	4	34,400	7,700	785
Macaroni noodles	Th. tonnes	158	4,993	1,666	26,645	177	5,288	3,900	7,900
Flour milling	-	-	-	-	-	-	-	-	-
Breakfast food	Tonnes	4	6,590	630	72	4	6,590	820	248
Pearl barley	"	3	2,550	208	22	3	2,550	525	61
Corn flakes	"	-	-	-	-	1	-	-	-
Oat flakes	"	-	-	-	-	3	3,223	225	17
Snack food	"	-	-	-	-	-	-	-	-

Source: DGTD annual reports.

(Financial Express 26 December 1989, 1)



## Export

## 44 India's exports of spices

	Quantity - '000 MT		Value - Rs. crores	
	1987-88		1988-89	
	Q	V	Q	V
Pepper	41.01	240.58	41.07	187.78
Cardamom (small)	0.27	3.40	0.79	10.28
Cardamom (large)	0.16	0.70	0.43	1.86
Chillies	6.12	8.33	5.42	12.06
Ginger	2.63	4.89	5.20	9.22
Turmeric	8.74	9.23	16.52	17.37
Curry powder	2.56	4.38	2.73	5.04
Seed spices	7.71	10.56	17.53	18.37
Other spices	0.65	1.04	4.26	2.51
Spices oils and oleoresins	0.43	14.97	0.49	18.30

Source: Spices Board  
(Financial Express 5 January 1990, 8)

## 45 Cashew exports up

The export of cashew kernels registered a growth of 38 per cent both in quantity and value during January-October 1989.

The exports during the ten months was 36,345 tonnes valued at Rs. 293.63 crores compared to 26,363 tonnes valued at Rs. 213.19 crores during the same period of 1988.

The import of raw cashewnut during January-October 1989 totalled 26,514 tonnes valued at Rs. 35.69 crores marking an increase of 35 per cent in quantity and 34 per cent in value under the imports during the same period of 1988, according to a cashew export promotion council.  
(Financial Express, 24 January 1990, 3)

## 46 Exports of oilseed extractions

(Quantity in M.T./  
Value in Rs. crores)

	Apr-Nov. 1989 (Actual)		Apr-March 1990 (Projection)	
	Quantity	Value	Quantity	Value
Deoiled rice bran	3,57,970	34.47	5,50,000	55.00
Rapeseed extractions	4,41,159	53.31	6,00,000	80.00
Sunflowerseed extractions	42,034	5.70	75,000	10.00
Salseed extractions	38,312	3.01	75,000	6.00
Mango, kernel, sesameseed and other extractions	16,828	3.40	50,000	10.00
Sal, mango kernel and other oils	1,850	4.28	4,000	9.00
Total	8,98,153	104.17	13,54,000	170.00

(The Economic Times 7 January 1990, 8)

## 47 Sesame seed exports to touch Rs. 1000 m

Sesame seed exports are poised to touch a record Rs.1000 million in the current year.

Shipments upto November 1989 amounted to 35,000 tonnes valued at Rs.450 million. It is expected that by the end of March next, at least 50,000 tonnes of more seed valued at Rs.650 million would be exported.

This year, a world-wide shortage has developed in sesame owing to a sharp fall in production in China and Latin America. On the other hand, due to a good monsoon, Indian production is estimated at 6,50,000 tonnes. The world trade sesame seed is about 4,00,000 tonnes, the major exporters being China, Mexico and Nicaragua.

India will be in a position to take advantage of this shortage especially because sesame oil is not widely used in the country except for some consumer preference in the south. Sesame oil is also used to the extent of five per cent compulsorily in the manufacture of vanaspati oil.

During 1988-89, export of sesame seed amounted to 18,000 tonnes valued at Rs. 200 million, which is now stated to go up to 85,000 tonnes valued at Rs.1000 million. However, about 30 to 40 per cent of the export contracts are under rupee clearance, even as India's exports are on a global scale with direct buyer-to-buyer contact in the West.



One damper is the very stringent storage control order which prohibits storage beyond the stipulated limits. With a view to curbing speculation and hoarding the government has introduced a law and districts with specific storage limits. In category C, for instance a licence-holder is not permitted to store more than 75 tonnes at any given point of time.

(Economic and Commercial News 20(3), 1990, 4)

#### 48 Groundnut meal export resumes

The export of groundnut extractions has come to a virtual standstill as a result of the poor quality of the crop. Gujarat which is the largest producer of groundnut in the country is expected to contribute a mere 16 lakh tonnes (on inshell basis) this kharif season, against 24 lakh tonnes last year.

Not only is the 33 per cent fall in volume significant the quality too has turned out to be wanting in several respects. It is reported that the protein content in the kernels this year is less than normal, while the oil content and physical characteristics are also below expectation.

This has caused a serious problem to exporters of groundnut extraction. Based on the timely advent and progress of monsoon, the trade was expecting a bumper crop of groundnut in Gujarat, estimated by some as high as 30 lakh tonnes.

However, nature willed otherwise. The crucial late rains failed. The crop suffered moisture stress conditions during the critical pod maturation period. This indeed has affected the overall quality of the Gujarat crop.

Even by August and early September relying on optimistic crop forecasts exporters had contracted for over 200,000 tonnes of groundnut meal and for over half of the contracted quantity the shipment period was between November and February.

These contracts worth approximately Rs. 20 crores, were for supply of meal containing 50 per cent oil and albuminoids (50% O and A). However when actual arrivals of the harvested crop commenced suppliers found the protein content lower and refused to deliver 50 per cent O & A quality extraction creating an impasse on the export front.

Mercifully, the Groundnut Extractions Export Development Association (GEEDA) broke the stalemate. In a joint meeting with some buyers a few days ago it was decided that contracts stipulating 50 per cent O & A combined will be converted into contracts for the supply of 45 per cent O & A and that the sellers will grant the buyers a discount of Rs 150 per tonne as allowance for lower protein content.

Respecting the revised terms, initial shipments are reported to have commenced and will pick up momentum. As a consequence, the local market which had weakened as firmed up again.  
(The Economic Times 9 December 1989, 3)

#### 49 Soyameal export

Exporters of soyabean extractions are fully geared to meet a second active season in succession. The export trade has never had it so good with a large supply of the essential raw material - soya-bean - and numerous overseas enquiries.

Thanks to a good monsoon this year, soyabean production has gone up by about 10 per cent to 18.5 lakh tonnes during kharif for the crop year 1989-90. Major contribution is of course, from Madhya Pradesh - declared as soyabean state - accounting for some 14 lakh tonnes and the rest coming from Maharashtra, Rajasthan, Uttar Pradesh and others.

Last year (1988-89) soyabean output was 17 lakh tonnes. By September this year, the general expectation of the soyabean crop was as much as 24 lakh tonnes. However, because of unfavourable weather towards the fag end of the monsoon, the yields suffered and the actual output was restricted to 18.5 lakh tonnes.

Be that as it may export of soyameal is once again poised to scale a new peak this year both in terms of volume and value. During the financial year 1988-89 the value of foreign exchange earned on soyabean extraction was a whopping Rs. 297 crores. This was almost 50 per cent of the total foreign exchange contributed by the oilseeds oilmeals and oils group.

The volume of export was 743,354 metric tonnes out of which nearly 75 per cent equal to 570,000 tonnes were exported between October 1988 and March 1989.  
(The Economic Times 16 December 1989, 6)

#### 50 Export of marine products

India exported a record Rs. 597.85 crore worth of marine products last year despite stiff competition from China, Thailand, Ecuador and the Philippines.

The previous year, it exported 90,179 tonnes of marine products valued at Rs. 531.20 crore, sources said.

Export of frozen shrimp last year was 56,835 tonnes valued at Rs. 47,033.15 crore while export of frozen lobster tails suffered a setback with only 1,663 tonnes (valued at Rs. 2,360.44 lakh) compared to the 1988 figures of 1,863 tonnes (valued at Rs. 2,473.52 lakh). The export of cuttlefish and fillets decreased from 9,195 to 8,262 tonnes.



However the export of frozen squids showed a phenomenal rise last year. It rose to 16,374 tonnes from the previous year's figure of 7,621 tonnes. The export of fresh frozen fish also received a setback.

(Deccan Herald 1 February 1990, 14)

#### 51 Silver pomfret export allowed

Export of fresh and frozen silver pomfret of weight two hundred grams and above will be allowed from Tuticorin Madras Kakinada Vishakhapatnam Paradeep and Calcutta ports says a notification issued by the office of chief controller of imports and exports.

It added that such fish of weight 300 grams and above will be allowed to be exported from all other ports on decontrolled basis. (The Economic Times 18 January 1990, 4)

#### 52 Onion exports

Onion exports are likely to exceed three lakh tonnes this year against last year's 2.35 lakh tonnes and 1.41 lakh tonnes in 1987-88 reports UNI.

The government has asked the national agricultural co-operative marketing federation of India limited (Nafed) to maximise onion exports.

The Deputy Prime Minister Mr. Devi Lal who is also Agriculture Minister has ordered NAFED to immediately purchase for export 30,000 tonnes of onions from Nasik district of Maharashtra where prices have crashed to a record low.

The Minister also agreed to enhance the annual export quota from 2.75 lakh tonnes to 3.25 lakh tonnes. Nasik district produces 50 per cent of the country's requirement of 20 lakh tonnes of onions. (The Economic Times 2/5 January 1990, 7)

#### 53 Inspection for export rice made compulsory

The commerce ministry has decided that compulsory pre-shipment inspection for basmati-rice export should be carried out either the export inspection agency (EIA) or the agricultural marketing adviser (AMA)

These agencies have been advised to enforce the prescribed standards strictly to ensure that non-basmati rice is not exported in the name of basmati rice and that consumers get rice of quality standard according to an official release.

The government recently reviewed the procedures for preshipment inspection of basmati rice and decided that there should be strict compliance with quality standards.  
(The Economic Times 1 January 1990, 1)

## Trade Information

### 54 Italy for Tie-ups in food processing sector

Italy in concert with the United Nations Industrial Development Organisation (UNIDO), is drawing up a scheme that will lead to tie-ups between Indian and Italian firms in the food processing sector. The proposed scheme will be funded by the World Bank. There is a bright prospect for Indo-Italian cooperation in the processed foods industry says Dr. R. Orlando Chairman of the Italian section of the India-Italy Joint Business Council. Steps are being taken to boost Indo-Italian ventures. This includes active participation by Italy in the trade fairs, the setting up of three Italian banks and two trade offices in Bombay and Delhi. A number of items have been identified for potential exports from India and these include processed food products, artificial and synthetic fibre and readymade garments.  
(Industrial Products Finder 18(4) 1990, 107)

### 55 BIS opens branch office in J & K

A new branch office of Bureau of Indian Standards has started functioning at Srinagar in the State of Jammu and Kashmir. This has been done to give boost to standardisation and quality certification in the state. This office will help in disseminating information on standardisation, certification, quality assurance, testing and other services offered by the Bureau. It will also provide assistance in procurement of Indian and International standards. The Bureau will maintain close liaison with and render service to industry trade and commerce in the State of Jammu and Kashmir.  
(Industrial Products Finder Annual 1989, 293)

### 56 Information centre by DGTD

The office of the Director General of Technical Development (DGTD) is in the process of setting up a technology information centre attached to it.

Announcing this here on Friday, the DGTD Mr. H. C. Gandhi said that the main objectives of the centre would be to collect analyse and disseminate information on industrial technologies.



The centre would provide information on the sources of availability of commercial proven technologies and the future development trends.

(Financial Express 6 January 1990 4)

#### 57 BSN Groupe expertise for Britannia Industries

Britannia Industries Ltd may soon get the technical and marketing support from one of the largest food products companies in the world, BSN Groupe of France.

According to Mr. J. M. Rajan Pillai, the tie-up will strengthen Britannia's drive to dominate the bread and biscuits market and diversify into dairy products like chocolates ice creams and yogurts.

(Financial Express 5 January 1990, 4)

### Food Regulation Quality Control and Hygiene

#### 58 Solvent extracted oil, de-oiled meal and edible flour (Control) Amendment Order, 1989

G.S.R. 767(E):- In exercise of the powers conferred by section 3 of the Essential Commodities Act 1955 (10 of 1955) the Central Government hereby makes the following order further to amend the Solvent-extracted oil. De-oiled Meal and Edible Flour (Control) Order, 1967, namely:-

1. (1) This order may be called the Solvent-Extracted Oil, De-oiled Meal and Edible Flour (Control) Amendment Order, 1989.

(2) It shall come into force on the date of its publication in the Official Gazette

2. In the said Order in the Fifth Schedule in the table to item 4 the following entries under column 5 shall be inserted against corresponding serial numbers in column namely:-

TABLE IV

Requirements for Solvent Extracted Edible Flour						
Characteristics						
1	2	3	4	5	6	7
(i)					9.0	
(ii)					48.0	
(iii)					—	
(iv)					7.2	
(v)					0.4	
(vi)					1.5	
(vii)					—	
(viii)					4.2	
(ix)					170	
(x)					30	
(xi)					—	
(xii)					—	
(xiii)					50,000	
(xiv)					10	
(xv)					nil	
(xvi)					—	
(xvii)					—	

[No. 1/2/89-SEO]

A.K.GOSWAMI Jt. Secy.

(The Gazette of India Part II - Section 3-Sub-section(i) No.433, 1989)

## 59 New and revised Indian Standards on Food

- |    |                               |   |
|----|-------------------------------|---|
| 1. | IS 548 (Part 2/Sec 21) : 1988 | Methods of sampling and tests for oils and fats: Part 2. Purity tests. Section 21. Tests for detection of animal fat in vegetable oils and fats and vice-versa by GLC (fourth revision) Gr.2. |
| 2. | IS 1000 : 1989                | Milk and milk products - lactose commercial (first revision) Gr.2   |
| 3. | IS 1307 : 1988                | Aldrin EC (third revision).Gr.2   |
| 4. | IS 1483 : 1988                | White bread (third revision) Gr.4   |



5. IS 2237 : 1989 Ready idli mix (first revision) Gr.4
6. IS 3811 : 1988 Alcoholic drinks - rum (second revision) Gr.2
7. IS 4100 : 1988 Alcoholic drinks - gin (first revision) Gr.1
8. IS 4450 : 1988 Alcoholic drinks - brandies (second revision) Gr.2
9. IS 7463 : 1988 Wheat flour (maida) for use by bisuit industry (first revision). Gr.2
10. IS 7464 : 1988 Wheat flour (maida) for use in bread industry (first revision). Gr.3
11. IS 8538 : 1988 Alcoholic drinks - toddy (first revision) Gr.1
12. IS 12408 : 1988 Gum karaya, food grade, Gr.3
13. IS 12451 : 1988 Margarine Gr.6
14. IS 12486 : 1988 Meat inspection table Gr.1
15. IS 12501 : 1988 Ferbam, technical Gr.2.
16. IS 12502 : 1988 Glyphosate, technical Gr.2
17. IS 12543 : 1988 Meat and meat products - poultry products - canned egg curry, Gr.2
18. IS 12516 (Part 2) : 1988 Method for determination of physical characteristics of doughs made from wheat flour: Part 2. Rheological properties using an extensograph Gr.3
19. IS 12516 (Part 3) : 1988 Method for determination of physical characteristics of doughs made from wheat flour: Part 3. Water absorption and rheological properties using a valorigraph Gr.3
20. IS 12529 : 1988 Storage of foodgrains - storage losses by insects - Methods for estimation Gr.1

21. IS 12516 (Part 1) : 1988

Method for determination of physical characteristics of doughs made from wheat flour Part 1. Water absorption and rheological properties using a farinograph. Gr.4

22. IS 12544 : 1988

Carbonated beverages - non alcoholic - beer Gr.1

23. IS 12561 : 1988

Poultry products - pickled quail eggs. Gr.3

24. IS 12564 : 1989

Fried jack fruit chips Gr.2

25. IS 12565 : 1989

Salted and spiced fried dals Gr.2

26. IS 12566 : 1989

Ready-to-eat" extruded snacks. Gr.2

27. IS 12569 : 1989

Potato French fries. Gr.3

28. IS 12575 : 1989

Fried potato chips. Gr.2

29. IS 12582 : 1988

Ferbam WP. Gr.1

30. IS 12609 : 1989

Pesticides - determination of residues in foods - fenthion Gr.2

31. IS 12610 : 1989

Pesticides - determination of residues in foods - phosphamidon Gr.1

32. IS 12611 : 1989

Pesticides - determination of residues in foods and water - endosulfan, Gr.1

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(Standards India 3(1), (3), (5-7), 1989)

60 Mustard oil disallowed in vanaspati

The government has decided not to extend the facility of usage of expeller mustard/rapeseed oil in the manufacture of vanaspati beyond today, December 15, 1989, reports PTI.



The decision has been taken after reviewing the existing policy regarding the usage of such oil in the manufacture of vanaspati and also having regard to the overall availability of oils and the fresh kharif crop according to an official statement here.

Earlier the government had allowed usage of 20 per cent expeller mustard/rapeseed oil in the manufacture of vanaspati.  
(The Economic Times 16 December 1989, 2)

#### 61 Ban on use of mineral oil in food articles

The Government proposes to prohibit use of mineral oil in any form in food articles except where such addition is specifically permitted in accordance with the standards laid down under the Prevention of Food Adulteration Rules.

The Prevention of Food Adulteration Rules are to be amended accordingly an official release said.  
(Deccan Herald 24 January 1990, 14)

#### 62 Chewing pan (betel)

Pan is chewed in almost every part of Indian subcontinent for a variety of reasons such as for digestive (digesting rich food) carminative (expelling flatulence) and aphrodisiac and aromatic properties. A very large number of people take tobacco also with pan. Because of the commonality of pan consumption in India all the year round, BIS has formulated Indian Standards on some of the items used in its preparation. These are: (a) Kattha (IS 4359 : 1967); (b) chewing tobacco, Zarda flake type (IS 2344 : 1973) (c) chewing tobacco, manufactured, minced type (IS 3041 : 1973); (d) cardamom, both capsules and seeds (IS 1907 : 1984); and (e) cloves whole and ground (IS 4404 : 1975). Besides, an Indian Standard is available which specifies methods of sampling and test for Kattha.

These standards prescribe general requirements, packing and marking specifications and sampling norms for the above items. The Indian Standard on cloves (IS 4404 : 1975) additionally stipulates their chemical requirements as well as their methods of storage and transportation. The Indian Standards on Kattha and the two varieties of zarda prescribe methods of test to verify the conformance of the end products to the relevant Indian Standards. Briefly, the general and testing requirements for the above items as stipulated in the Indian Standards are as under :

Kattha shall be free from water soluble catechu - tannic acid or cutch leaves bark and other cellulosic materials adulterants and moulds as well as unpleasant odours and be astringent with slightly bitter taste. Tests are required to be conducted as stipulated in IS 2962 : 1964 to determine the conformity to requirements like catechu content and poisonous metals like arsenic lead copper zinc and tin in Kattha.

-- Zarda is required to be free from mould attack and shall not contain any substance injurious to health as covered under Dangerous Drugs Act, 1930. Besides, Zarda is required to meet the requirements for nicotinic acid total ash and acid-insoluble ash when tested in accordance with the methods laid down in "IS 5643 : 1970. Methods of test for tobacco in tobacco products"

-- Cardamom capsules shall be of colour ranging from light green to brown cream and white be of global size or three-cornered having a ribbed appearance; be well-formed with sound seeds inside have characteristic and fresh flavour; and be free from foreign taste and aroma as well as moulds and insect infestation. The proportions of empty malformed immature and shrivelled capsules and light seeds of cardamom as well as extraneous matter in different grades have also been prescribed in the Standard. Besides levels for moisture content and volatile oil content have been stipulated which may be determined in accordance with the test methods given "IS 1797 ; 1986 Methods of test for spices and condiments"

-- The whole cloves should be fully grown and reddish brown to blackish brown in colour; have a strong aromatic spicy flavour; and be free from mustiness moulds and insects. The cloves may be graded on the basis of percent clove stems headless cloves and extraneous matter. The permissible moisture content and volatile oil content in each grade has and may be tested in accordance with the methods laid down in the relevant Indian Standard. Not many people have arrangements for preparing pan in their homes. Such persons throng around roadside pan vendors for their daily needs. Most of the consumers are either oblivious of or ignore the filthy conditions in which pan vendors carry on their business. As health and hygiene are important aspects of national well being. BIS has also formulated a code of hygienic conditions for pan (betel) stalls and vendors (IS 6968 : 1973). This standard provides guidelines on basic hygienic conditions for these shops and is subject to the provisions of the Prevention of Food Adulteration Act, 1954.

The salient aspects of Code are:

a) approval of public health authorities for the site to establish the pan shop whose area should not be less than 1.50 x 1.50 m (2.25 m ) and the platform height for keeping the pan leaves not less than 25 cm above the sitting arrangement;

b) proper arrangement for waste water drainage and disposal;



c) storage of pan in glass cupboard and ingredients used in it in containers covered with lids;

d) use of stainless steel or chinaware or aluminium or tincoated brass utensils of easily cleanable and non-corrosive nature for kattha chuna etc;

e) storage of potable water in receptacles with tight-fitting lids and taps;

f) provision of spittoon containing sand or slaked lime or both in the pan shop;

g) observance of personal hygiene by the pan vendors and persons employed in the pan shop; and

h) provision of a dust bin of approved pattern for depositing the shop wastes.

(Standards India 3(6), 1989, 224-5)

### 63 Hygienic conditions for the sale of cut-fruits fruit juice and fruit salad

Stalls selling cut-fruits fruit juice and fruit salad are a common sight almost in all the cities in India. Since these stalls are not generally maintained properly consumption of these items from such stalls may be a potential health hazard to the consumers. Concerned with their unhygienic conditions, BIS had laid down a code of hygiene for such stalls (IS 8123 : 1976) a long time ago.

The Standard prescribes that these stalls shall be established at places approved by public health authorities and where counter service is available the height of the counter from ground level shall be not less than 2 and more than 2.5 metres.

The number of rooms in these stalls shall depend upon the job requirements. For instance only one room shall be needed for the sale of cut-fruits and fruit juice as well as storage and cutting of fruits and extracting fruit juice and their consumption in the same premises. However if fruit salad is also prepared and served for consumption in the premises there shall be two rooms. In this case while one room shall be used exclusively for serving the articles for consumption, the other shall be used for the remaining activities. The minimum floor area of each room is required to be 9 m with any one side not less than 2.5 metres and height not less than 3 metres. The Standard also requires the room to be well lighted and ventilated with smooth and impervious floors having suitable gradient to enable water to flow out in a drain or sewerage system. The walls of the room are required to be oil-painted or rendered impervious to moisture and dirt up to a height of at least 2 metres. The upper portions of the walls should be lime washed twice a year. All wood work shall be oil painted every three years.

The stall selling cut-fruits, fruit juice and fruit salad is required to have an impervious platform with potable water supply. Water if stored, should be in suitable receptacle placed on a 1 metre high stand and shall be provided with a tight-fitting cover and a tap. It shall be ensured that water is not contaminated while handling and storing.

IS 8123: 1976 stipulates that all edibles connected with the trade shall be kept in a fly-proof safe to prevent contamination by dust, flies and other insects. Before cutting or extracting juice, the fruits are required to be thoroughly washed. The juice extractor too shall be subjected to this exercise.

The utensils used for preparing and serving cut-fruits juice and salad are required to be in good condition. Broken, cracked or chipped crockery or cutlery shall not be used in the licensed stalls. Tumblers (and saucers) should preferably be of disposable type. Reusable tumblers shall be disinfected with chlorine solution followed by washing with potable water. The premises shall be sprayed once a day with pyrethrum or similar insecticides and also treated with insecticides by the Municipal Authorities or other approved bodies once in four months.

Employees hygiene is as important in dealing with the preparation and sale of edibles as that relating to various other items. The Standard therefore, makes it obligatory that the persons handling fruits shall be X-rayed for tuberculosis and inoculated against typhoid and paratyphoid A at the time of appointment and thereafter once in five years. Their stool should also be examined for cholera germs and other harmful bacteria and parasites. The employees are required to follow the norms of personal hygiene as detailed in the Standard.

The stall selling cut-fruits fruit juice and fruit salad shall neither be used for residential purposes nor should sanitary conveniences be within or communicate directly with the stall.  
(Standards India 3(7) 1989, 260)

#### 64 Energy food for poor pregnant women

The ministry of food processing industries has decided to set up manufacturing facilities for energy food to take care of iron and other nutritional requirements of expectant mothers belonging to weaker sections.

This food will be made available at a lower price according to Mr. Shard Yadav minister for textiles who is also holding additional charge of food processing industries.

Mr. Yadav told The Economic Times that two plants each involving an investment of Rs. 1.2 crore would be set up in Uttar Pradesh, to begin with. Later other states will be covered.



Giving details of the scheme, he said the first plant is to come up in Badaun district. The proposed extruded energy food will provide 100 gm, 40 calories and 14 to 16 gm protein. This is expected to cost about 80 paise.

In the second phase, MFIL planned to put up similar manufacturing facilities in West Bengal Gujarat or Goa and Tamil Nadu so as to ensure coverage of the entire country Mr.Yadav said.  
(The Economic Times 2 January 1990, 7)

### Transfer of Technology and New Industries

#### 65 Reliable foods

A modern snacks food plant Reliable Foods has been set up recently at Mandideep. It has been set up with technical assistance from Western and Japanese companies. The company has launched its products in the country. It has also started exporting its products to the Middle East countries. It expects a turnover of Rs.5 crore per annum.

(Industrial Products Finder 18(4), 1990, 129)

### Personalia

## PAN MASALA : PRESENT STATUS

The habit of chewing betel quid has acquired enormous proportion in India today. A moderate estimate of betel quid chewers in India is around 20 million. In fact, it outnumbers the smokers. The statewide prevalence of chewing habits is depicted in Table-1. Several ingredients go into the preparation of betel quid and it is time consuming to prepare the betel quid. Therefore using Indian Technology, the industry has brought forth a ready-for-consumption product packed in small convenient sachets. This product is 'Pan Masala'. It has almost all the ingredients that are present in betel quid except the betel leaf. Moreover, this product is not chewed for a long time but swallowed. With the help of different mass media, pan masala has become very popular in India and the other Third World countries. Its sale has reached more than Rs. 300 crores per year. It is popular among all age groups. Pan Masala is exported to countries in the Middle and Far East.

There are more than twenty popular brands of pan masala in India. Some are sweetened while others are not. The approximate composition of pan masala is given in Table-2. It can be seen that sweet pan masala has dry dates as a sweetening agent but some brands do contain saccharin as a sweetener. The major ingredients of pan masala are betelnut, catechu, spices and menthol. The constituents of betelnut and its major alkaloids are given in Table-3. Of these, arecoline is the most important by virtue of its toxic effects. In normal doses it is cholinergic (activates the parasympathetic nerve) sialogogue (induces salivation) and diaphoretic (causes perspiration) while in higher doses it depresses the central nervous system and affects dental enamel. The constituents of catechu are given in Table 4.

### Effects of chewing betelnut

Pioneering work in India on the effects of chewing betelnut, betel quid on the incidence of cancer has been done by Khanolkar (1944), Ranadive (1976) and Bhinde (1979) of Cancer Research Institute, Bombay. That chewing betelnut (supari) with tobacco increases the incidence of oral cancer is well known. The International Agency for Research on Cancer (IARC) has done comprehensive literature survey on the effects of betel quid and arecanut chewing. Several workers from India and abroad have investigated the effect of chewing betel quid with and without tobacco and also chewing arecanut with and without tobacco on the incidence of oral cancer, in general, the results of these investigations can be summarized as follows :

Table - 1.

Prevalence of Betel quid Chewing Habits

Location	Sample size X 1000	With tobacco %	Without tobacco %
Gujarat	10	3	1.5
Kerala	10	26	0.4
Andhra Pradesh	10	2.3	0.5
Bihar 1	10	13	0.4
2	10	15	1.3
Maharashtra	101	28	0.6

IARC (1985) Vol. 37

Chewing betel quid along with tobacco is proven to be carcinogenic to humans. However evidence is inadequate to indicate that chewing betel quid without tobacco is carcinogenic to humans. The carcinogenic effect of betel quid and arecanut in experimental animals has been indicated only in limited studies and hence a definite conclusion cannot be arrived at. The other major ingredient of pan masala namely catechu has also been shown by Giri et al. (Cancer Lett. 36, 189, 1987) to cause changes in the genetic material of cells in mice. It can be deduced that catechu has a potential to cause cancer.



Menthol is added to some brands of pan masala to give a cooling effect when put in the mouth. It also adds to the flavour. It was feared that addiction to menthol may occur. However, only one case so far has been reported in a woman smoking mentholated cigarettes. She however recovered when this habit was discontinued. Also, it can be deduced that addiction is more to cigarette smoking itself than to menthol alone. Menthol is added to several lozenges used to soothe sore throat. It is present in almost all cough syrups, and is approved by the Food and Drug Administration (FDA), U.S.A. for food use. Although the FAO/WHO expert committee on Food Additives has allocated an unconditional Acceptable Daily Intake (ADI) of 0-0.2 mg/kg body weight, many of the Western countries permit its use in food based on Good Manufacturing Practice (GMP).

Table-2.  
Approximate Composition of Pan Masala %

Ingredients	Sada	Meetha
Betel nut (arecanut)	80	10
Dry dates (chuaara)	-	70
Catechu	10	10
Lime	1	1
Spices (cardamom, clove, mace, cinnamon, menthol, etc.)	9	9

It is logical to consider that any product which contains a known toxic substance as its ingredient is likely to be harmful. It remains to be seen whether the different toxic ingredients present, act synergistically and enhance the toxicity. 'Pan Masala' as mentioned earlier, contains almost all the ingredients of betel quid except 'pan' or betel leaf. Hence it is likely that pan masala inherits the toxic effects manifested by arecanut. Several reports based on research have appeared in the newspapers regarding the harmful effects of using pan masala.

### Cytogenic effects

Assessment of carcinogenicity of a substance takes several years by the conventional procedure. There are certain short term tests which indicate whether a substance can be carcinogenic. However, one should be aware that not all the compounds, which these short term test indicate as carcinogens, may really cause cancer. These short term studies are also known as genotoxic studies, meaning thereby that the compound is toxic to the genetic material of the cells, which in turn decides whether a cell can turn into a cancerous one. Adhvaryu et al. (Indian J. Med Res. 90, 131, 1989) have assessed the genotoxic effects of pan masala by studying the

chromatid exchange (SCE) and chromosomal aberration (CA) in Chinese hamster ovary cells. It was observed that cells treated with the extract equivalent to as little as 1.11 mg of pan masala for a small period of 3 hours, produced statistically significant increase in SCE frequencies indicating the genotoxicity of this product. Further the authors, in their paper have mentioned the available evidence on the genotoxic properties of betelnut and catechu (thus) explains the elevated SCE and CA frequencies observed in the present study. Another study on pan masala was conducted at the Ear, Nose, Throat (ENT) Department of Post-graduate Institute of Medical Sciences (PGIMS) in Chandigarh. In this study the researchers made a paste of pan masala and applied it to the oral mucosa of rats on alternate days for 6 months. After 2 months, three rats out of 21 studied showed an increase in parakeratosis (abnormal growth of corneous layer of epidermis). The basal cells became more prominent. Also observed was a condensation of collagen bundles in these cells. These changes became more marked after 4 months. After 6 months they observed in the majority of rats of the group painted with the paste of pan masala, more than one precancerous signs and also sign of submucosal fibrosis. They were prompted to conduct this study in view of recent sudden 10 per cent increase in the number of patients with submucosal fibrosis. Bali (1989) has reported the results of the survey conducted on the incidence of oral lesions in the population consuming pan masala. In this study, 3 categories of pan masala users namely; light, intermediate and heavy users and variable ways of consumption namely; swallowers, retainers in the mouth and spitters, were investigated.

Table-3  
Constituents of Arecanut (per 100g.)

### Nutrients

Protein	5-9 g.
Carbohydrates	47-84 g.
Minerals	: Calcium, Phosphorus, Iron.
Vitamins	: Carotene.

### Non-nutrients

Tannins	11-26 mg.
* Alkaloids	150-670 mg.

\* Alkaloids in Arecanut include Arecoline (N-methyl guvacine methylester), Arecaidine (N-methyl guvacine), Guvacine (3-tetrahydrocatimic acid-3 carboxylic acid) and Guvacoline (Guvacine methylester).



Normal dose	:	Cholinergic, Sialogogue and Diaphoretic.
Higher dose	:	CNS depressant, affects dental enamel.

he observations can be summarized as follows :

- i) Hyperplastic dysplastic and cancerous conditions were more in the intermediate and heavy users
- ii) These conditions were quite common in those who swallowed or retained in the mouth as compared to spitters.
- iii) Pan masala chewed along with betel quid showed greater incidence than pan masala taken singly.

Before arriving at a definite conclusion on the above studies, the following points have to be borne in mind

1. Keratosis and parakeratosis are non-specific in response to any irritation. However, loss of nuclear polarity is suggestive of possible neoplastic change at times this situation may be seen in severe cases of hyperplasia

2. The absence of any significant increase in mitotic figures rules out an obvious neoplastic change

Table-4.

COMPOSITION OF CATECHU	%
Moisture	12.5 - 12.9
Tannin	57.3 - 59.1
Catechin	14.2 - 17.2
Extractives (non tannin)	24.4 - 26.5
Insoluble matter	3.6 - 4.2
ash	1.4 - 1.6

Wealth of India. Vol. I, 1948, p. 10.

## NIN STUDIES

From the studies mentioned above, it can be surmised that pan masala can cause oral cancer perhaps due to its constituents arecanut and catechu. These studies do not however indicate that use of pan masala has greater incidence of cancer than the betel quid chewers.

Recently mutagenicity studies (Ames test) using Salmonella typhimurium strains were carried out at National Institute of Nutrition (NIN), in the aqueous

personal communication). It was observed that in both the strains aqueous extracts were mutagenic.

Yet another point of interest is whether sweet pan masala which contain saccharin can further complicate the issue. Saccharin is reported to induce urinary bladder cancer. Commenting on the use of saccharin, IARC's monograph says "There is a small increase in the risk of urinary bladder cancer in general population consuming high doses of saccharin. However, epidemiological data provide no clear evidence that saccharin causes urinary bladder cancer. There are no epidemiological studies as to a positive association between use of saccharin and cancer at other sites in humans

Now the two questions, whether pan masala has more potential as a carcinogen than arecanut and whether pan masala containing saccharin have further increased potential has to be established. These can be investigated by various short term studies used in assessing carcinogenicity by comparing the effects of known carcinogen in the arecanut namely, arecoline to different products in pan masala. Further, the pan masala once equated to the arecoline content can be tested with and without saccharin for its potential as a carcinogen.

## Recommended measures

The young population should be made aware of the potential dangers of use of tobacco, arecanut (supari) and pan masala. This has been achieved in case of smoking in developed countries, where the younger population has reduced smoking considerably. A statutory warning similar to that on the cigarettes can be put on the sachets of pan masala. The warning can also stress on the upper limits of consumption (4 g which is equivalent to one sachet of pan masala). The industry can take a technological challenge to manufacture pan masala without arecanut. It will be meritorious if a technology is developed to make arecanuts devoid of arecoline. This has been achieved in case of decaffeinated coffee. Arecanuts without or at least with low levels of arecoline can be attempted to be developed by genetic engineering. Banning the sale of pan masala is not the solution to the problem. This will have its own repercussions similar to that of drug addiction. Once the product is banned, not only the prices will shoot up in the underground trade but also the quality of the product will deteriorate with more deleterious effects on health. In the present situation creating awareness among the people appears to be the best solution.

- Dr. Indushekhar Shenolikar



STATEMENT ABOUT "FOOD DIGEST"  
FORM IV

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## Raw Materials

### 66 Grape seed oil

Grape seed oil is a by-product of the wine industry. The oil has been used for generation in the Mediterranean countries and is now getting popular in USA as a cooking oil. The oil is extracted from wine grape seeds. After the grapes are pressed to harvest the juice, the seeds, leaves and stems remain. Grapeseed oil manufacturers separate the seeds, then dry them, heat them and press the oil. It takes 1000 pounds of wine grapes to manufacture 4 lbs of grapeseed oil.

It is reported that grapeseed oil has one of the lowest saturated fat levels in the cooking oil market and contains more linoleic acid than any other cooking oil. Tests on the oil has shown that it contains 77% or more linoleic acid.

The wine industry in India is coming up fast in Goa, Karnataka, Maharashtra. However, our grape industry is not aware of the significance of grapeseed oil. The grape seeds are going to waste at present. Indian entrepreneurs should look at this waste for the production of grapeseed oil for consumption, by the affluent health-conscious section in urban India.  
(Journal of the American Oil Chemists Society 66(8), 1989, 1043)

### 67 Indian flea seeds against cholesterol

An obscure little town of farmers in Gujarat is warming up for a bumper crop. A nondescript household remedy for stomach disorders long known in India, flea seed, which is an exclusive produce of Sidhpur in the western Indian state, has become the subject of a national debate in the United States. And the answer to this debate could well be the answer to the global problem of heart disease.

Sidhpur has a near-monopoly on the world's supply of flea seed, also known as flea wort, or psyllium; a tiny, tasteless, obscure seed that, according to early research, may reduce cholesterol levels in the blood.

Ever since the link with cholesterol was disclosed, psyllium has been an increasingly popular ingredient of breakfast cereal in the United States. If further research proves the seed's benefits, this dusty farm district could become the epicenter of a health-food fad.

"This seed is not grown anywhere else in India, or anywhere in the world", according to T.V.Krishnamurthy, a vice president of Procter and Gamble India, a major psyllium buyer and exporter. "The proper climatic conditions do not exist in many places in the world".



Arvind Patel, a processor and exporter of the seed, says: "If psyllium takes the place of oat bran, we will need huge quantities of it from Sidhpur".

This outcome, however, will depend on further research and trials and approval of monitoring organizations like the U.S. Food and Drug Administration (FDA). But one thing is certain: psyllium will be solely an export item from Sidhpur for a long time! Local farmers say it is as good a cash crop as mustard, but they have no desire to eat a bowl of psyllium every morning - cholesterol phobia has not yet reached rural India.

For decades, psyllium husk has also been the main ingredient in such laxatives as Procter and Gamble's Metamucil, a top-selling brand in the United States, and CIBA-GEIGY's Fiberall. But after researchers recently discovered that soluble fibers also lower cholesterol levels in the blood, Cincinnati-based Procter and Gamble ordered studies on psyllium versus cholesterol.

One of the studies done at the University of Minnesota tested 75 people with raised cholesterol levels. After 18 weeks, the group that took three teaspoons of Metamucil daily saw a significant dip in their general cholesterol levels, and even larger reduction in levels of low-density lipoproteins, the "bad" cholesterol.  
(Science Update December 1989, 10-11)

## Storage and Infestation Control

### 68 Zinc chloride keeps fruit fresh

A dip in a zinc chloride solution can slow browning of cut apples, pears and peaches according to researchers at the Agriculture Dept's Western Regional Research Centre (Albany CA). The laboratory researchers note that browning is caused by polyphenol oxidase enzyme released from the fruit's cells when it is cut. The treatment delays browning - for several days - upto 10-weeks or more - of sliced fruit that has been bagged and refrigerated.  
(Chemical Weekly 35(28), 1990, 58)

### 69 Vapour treatment of fruits

The Plant Quarantine Division of the Philippine Bureau of Plant Industry has developed a process of using steam vapour treatment in the quarantine of fruits for export. The process involves vapour treatment of fruits in a vapour treatment chamber at a temperature of 46 C to kill pests. Exposure time depends on the type of fruit: mangoes are exposed for one hour 40 minutes and papayas for two hours. A humidity of 50% to 70% is required. The treated fruits are then cooled for 30 minutes under a cold water shower. The vapour treatment provides a longer shelf-life to fruits and prevents occurrence of post-harvest diseases.

For details, contact: Ma. Salome B. Del Rosario, Post Entry Plant Quarantine, Bureau of Plant Industry, San Andres, Malate, Metro Manila, Philippines  
(Asia-Pacific Tech Monitor September-October 1989, 26)

70 High pressure processing of foods for improved shelf life

High pressures (3000-5000 bar) can kill bacteria, viruses and spores, and control enzyme reactions, extending the shelf life of many foods. The biggest advantage of pressure treating over heating is that food retains, its original flavour and vitamins, which can be destroyed by heat. In addition pressure treatment can aid on the crystallisation, purification and separation of useful materials, reports Akinori Nogirchi, chief of the Food Engineering Laboratory with the Japanese Ministry of Agriculture, Forestry and Fishery.

MAFF has recently started a research consortium of 21 private companies to promote the commercialisation of high-pressure processing of such foods as eggs, honey, dairy products, meat and fish. Pressure treating is done in a cold isostatic press to which temperature control is added. High pressure is produced by a hydraulic pump. Most processing is done at room temperature, but in some cases higher temperatures may be used to enhance the effects of the high pressures.  
(Chemical Weekly 35(30), 1990, 106-107)

71 Preservation of frozen fish by ascorbic acid

The shelf-life of frozen fish may be extended for several months by a treatment with ascorbic acid, which can be applied by either dipping or spraying at a level of 0.5-3%. To ensure an even and sufficiently thick coating, a thickening agent should be added to solution.

For shrimp and prawns, a combination of citric acid and ascorbic acid shows the best result (0.5% ascorbic acid + 0.5% citric). Here also a thickening agent will improve the preservative action.  
(Chemical Weekly 35(22), 1990, 87)

72 Inert dust protects stored groundnut

A cheap and inert clay dust called ABCD, developed at the Indian Institute of Chemical Technology (IICT), Hyderabad, can help protect groundnut pods and peas from three species of storage pests.

Studies at the International Crop Research Institute for Semi-Arid Tropics suggest that the clay might help replace expensive and hazardous insecticides and fumigants.



Data from dusted and non-dusted seeds and pods suggest that the dust has a marked effect on the ability of insects to survive and reproduce. Two species, *C.cephalonica* and *T.castaneum*, were dead within 80 days after the seeds were treated.

Reporting their findings in an ICRISAT publication, researchers S.Mittal and J.A.Wightman said scientists in countries where groundnut is grown and stored in farms or large warehouses should evaluate the data on a larger scale in view of the potential use of the cheap dust.

Another ICRISAT study has shown that the presence of neem cake and *Ipomoea* mulches results in low levels of termites as these substances act as repellent barriers between the soil and groundnut pods.  
(P.T.I. Science Service 9(5), 1990, 1)

## Food Additives

### 73 Acetaldehyde as a natural flavour additive

There is a growing interest in producing acetaldehyde from a natural source for use as a natural flavour additive. Acetaldehyde contributes to the freshness, fruitiness and/or nuttiness of a great number of food systems including fruits, fruit juices, dairy products, alcoholic beverages, vegetables, spices, meats, bread, eggs and candies. Acetaldehyde also has potential uses in the post harvest storage and ripening of fruits. Because of the high volatility and reactivity of acetaldehyde, dry acetaldehyde delivery systems are currently being developed.

A novel approach to the microbial conversion of simple sugars to acetaldehyde for use as a natural flavour additive has recently been developed by Prof. Zall of Cornell University. In this method the non toxic bacterium *Zymomonas mobilis* is diverted from ethanol production to the production of acetaldehyde. This is accomplished by selecting mutants of *Z.mobilis* that are deficient in alcohol dehydrogenase, an enzyme which normally is responsible for the conversion of acetaldehyde to ethanol. When an alcohol dehydrogenase deficient strain of *Z.mobilis* was grown in a culture medium containing 4% glucose, nearly 40% of the theoretical yield of acetaldehyde was obtained based upon the amount of glucose consumed.

This new biotech method claims several advantages:

1. The method produces acetaldehyde suitable for use as a natural flavouring agent.
2. The yield of acetaldehyde obtained with this approach represents the highest yield published to date for the biological production of acetaldehyde.

3. The production method uses glucose, sucrose and/or fructose as inexpensive starch materials. This should prove more cost effective than earlier methods which produce acetaldehyde from ethanol. It may be applicable to residual or waste sources of sugars.

4. Neither enzyme nor catalysts are used in the process of eliminating the costs associated with producing acetaldehyde by such means.

5. The acetaldehyde produced was separated from solution by sparging the culture with air. The acetaldehyde was then collected from the air stream. This method of product separation from the reaction vessel lends itself well of both batch production and continuous production of acetaldehyde.

If the new process is commercialized, even higher yields are feasible given the likelihood of the following developments. (a) optimization of such reaction conditions as feed sugar concentration, temperature, pH and oxygen delivery rate; (b) maximizing the separation and trapping conditions for the acetaldehyde; and (c) immobilization of the bacteria and continuous fermentation.

The transfer of this promising technology for industrial utilization is contingent on the successful scaling up of culture conditions and on the retrieval of the acetaldehyde in a manner optimal for flavour use. A patent application has been filed covering this novel approach to the microbial production of natural acetaldehyde.

(Chemical Weekly 35(28), 1990, 98-99)

#### 74 Food additives and their categories

Food additives have long been associated the world over with consumer concerns. The latest definition of a Food Additive as defined by the EEC in Europe is very precise and covers all its aspects. 'Food additives means any substance not normally consumed as a food in itself, and not normally used as a characteristic ingredient of food whether or not it has nutritive value, the intentional addition of which to food for a technological purpose in the manufacture, processing, preparation, treatment, packaging, transport or storage of such food results or may be reasonably expected to result, in it or its by-products becoming directly or indirectly a component of such foods'

The major categories of food additives in advanced countries are:

- Colour, anti-oxidant emulsifying salt, gelling agent, flavour enhancer, acidity regulator, modified starch, raising agent, glazing agent, firming agent, sequestrant, bulking agent, preservative, emulsifier, thickener, stabilizer acid, anti-caking agent, sweetener, antifoaming agent, flour treatment agent, humectant, enzyme, propellant/packaging gas.

(Chemical Weekly 35(28), 1990 97)



## Processes

### 75 Removal of cholesterol from dairy products

About 95% of the cholesterol could be removed from butter and a little less from milk and cream, by a process being developed at the University of California. The technique is reported to be relatively simple, reports Thomas Richardson, Professor of dairy food science in the Department of Food Science and Technology.

Food grade saponins are stirred into the product and form an insoluble complex with the cholesterol. The complex is then filtered out, using a filter such as diatomaceous earth. The researchers working under Dr. Richardson have tested the process on the I-L scale and reports it could be easily scaled up, using conventional dairy equipment. A number of dairy companies in USA have shown interest in the commercialisation of the process for producing healthy cholesterol-free dairy products.  
(Chemical Weekly 35(30), 1990, 105)

### 76 New process for vanaspati

A new process to produce cheaper and hygienic vanaspati in just half the time presently taken by vanaspati factories all over the world has been developed by Dr. R. Rank, an eminent Indian molecular scientist. The process developed by him produced vanaspati which was seven and half times more hygienic and cheaper by 35 per cent.  
(The Oils and Oilseeds Journal 42(1-3), 1989, 90)

### 77 Liquid roasting of cocoa beans

Of the various techniques developed for roasting of cocoa, the future for cocoa lies in liquid roasting.

In general, the process of roasting consists of the formation of the aromatic fraction of cocoa, through activation of chemical reactions and physical phenomena. In non-liquid roasting, a continuous development of steam leads to an uncontrolled loss of some of the already formed aromatic substances. This is why liquid roasting is more beneficial for cocoa manufactures.

Because the presence of a great amount of humidity prevents the formation of pyrazine derivatives, it is important that the roasting process be preceded by a suitable drying phase at limited temperatures (Max. 100 C).

Adopting the process of liquid roasting technology involves obtaining raw masses, that is to say, unroasted cocoa which has just been dried and still contains at least 4-5% humidity.

In order for the aromatic fraction of cocoa to properly develop to the required level, it is necessary that the roasting process occurs under conditions which are as precise and repeatable as possible (particularly in regard to the roasting time). Respecting these conditions ensures optional roasting.

For further information contact: Carle and Montanarium, Milan, Italy.  
(Chemical Weekly 35(26), 1990, 101)

## 78 Mass production of omelettes

A group of French companies has built a completely automated system for cooking omelettes by induction heating.

A mixture of egg white and yolks from a breaking machine is stored in 1000-litre containers and is pumped to a funnel. The product passes into a double-walled, water-cooled heat exchanger, with surface scrapers, where it is pasteurised at 68°. It then passes into a feed tank with four nozzles located immediately above the cooling line.

The cooking tunnel is 18 metres long and is fitted with 11 sets of induction heaters: two for pre-heating, nine for heating totalling about 1000 spiral-wound induction heaters with 600 pans welded on beams. The pans are pre-heated for 15-18 seconds to heat the mixture of oils to 180° before the egg mixture is added.

The pans enter the oven in rows of four where the omelettes are heated to 80° for two minutes. During the cooking process, an electric generator produces steam to keep them moist. The average production rate is 6250 omelettes an hour.

When cooking is complete, the omelettes move into an initial cooling tunnel where they reach a temperature of 16° after four minutes. Then they move to the automatic folder and are then cooled once again for six-seven minutes to produce a core temperature of 2°. The omelettes are then packed in sets of ten in film-covered trays in a carbon dioxide and nitrogen atmosphere.

While the rapidly produced omelettes can be consumed directly, some of the other features include an excellent thermal output of the order of 80 percent, much greater than conventional ovens (20 percent), uniformity and fine control of temperature, presenting an unbroken surface, improving production hygiene and no environmental pollution.  
(P.T.I. Science Service 9(5), 1990)



## Byproducts and Waste Utilization

### 79 Anti-cholesterol compound from sugarcane

Cuban scientists have recently unveiled a new compound called PPG that reduces the cholesterol level in the blood and is derived from sugarcane.

During a recent symposium in Dec. 1989, the Cuban scientist Julian Rodriguez of the National Centre for Scientific Investigation (CNIC) reported that PPG is a completely harmless compound of natural origin made up of various sugarcane sub-products. Since 1987, Cuban researchers have carried out many tests and studies on different animals. Recently, they had also been able to carry out pre clinical tests on humans with positive results. PPG has also been shown to reduce arterial hypertension.  
(Chemical Weekly 35(28), 1990, 98)

### 80 Soft drink from waste whey

Whey, a waste product of the dairy industry, might soon be converted into a tasty soft drink through a new process developed by undergraduate chemical engineers at the Indian Institute of Technology (IIT) in New Delhi.

The process developed by students S.Bhatt and S.K. Goel working under Professor B.K. Guha at the department of chemical engineering involves the fermentation of whey with the bacterium Lactobacillus acidophilus.

The researchers believe that several million litres of whey churned out as a waste product by dairy industries across the country are currently being discarded as waste. Whey has a high biological oxygen demand (BOD) associated with it and when discarded without special treatment, it adds to pollution. But treatment processes for whey are energy-intensive and expensive.

In the new process, whey is converted into a drinkable product by fermentation to convert part of the lactose content of whey to lactic acid. The process involves inoculating whey obtained from pasteurized milk, with the therapeutically useful bacillium. Lactobacillus acidophilus, at 35 C. The mixture is then left to ferment at 38 C.

In small scale laboratory tests, the fermentation occurred fast, the reaction completing within six hours. However with lower microbial mass, the reaction time is expected to increase and side reactions will be minimised.

The fermented product at a desired acidity gave a flavour and taste of lassi, the scientists said. The process could be used to produce synthetic lassi and flavouring agents could be introduced into the drink to improve the taste, they said.  
(P.T.I. Science Service 9(3), 1990, 2)

## 81 Xylitol from straw

Surplus steam, from a power station, and surplus straw from arable farming have been combined to yield a highly saleable commercial sweetener, xylitol in a research project carried out by the Danish Institute of Biotechnology in collaboration with a Jutland power company.

The process can also be used to extract sweetener from deciduous tree wastes, although most of the research to date has concentrated upon straw, simply because surplus straw is available in very large quantities. Laboratory-scale production has been able to extract between 67 and 90 kg of xylitol per tonne of straw.

The process involves three stages -- extraction, fermentation and purification. In addition to xylitol, the process yields 90 kg molasses, 7 kg of yeast solution and 20 kg of plaster of Paris (calcium sulphate) per tonne of straw, as well as about 750 kg of extraction residue. The process uses 2 to 3 tonnes of steam (180-200 C) per tonne of straw.  
(Asia-Pacific Tech Monitor September-October 1989, 20)

## 82 Recycling fish waste

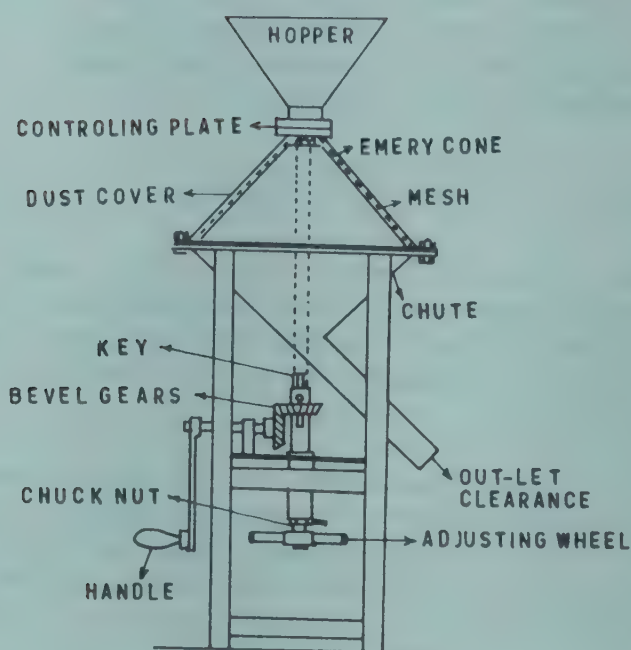
Refuse from fish factories can be a valuable nutrition for livestock. A British firm has designed a machine for converting heads, bones and offal into animal feed. The Fish Mutrator made by Mono Pumps Ltd can process 7 tons per hour with a 25 cm cutting head that pulverises the waste. Acid added to the slurry in a blending tank turns it into a nutritious silage that can be mixed with animal feed. The unit can be used on fishing trawlers too.  
(Asia-Pacific Tech Monitor September-October 1989, 22)

# Equipment and Machinery

## 83 Pulse dehusking machine for rural use

A simple hand-operated pulse dehusking machine has been developed for small scale rural processors. Consisting of an emerycoated metal cone fixed to a vertical shaft and rotating inside a conical wire mesh screen, the unit is operated by a handle and bevel arrangement. A screw at the base of the shaft can raise or lower the cone. A dust cover with a hopper at top envelops the screen. Another hopper collects the mill stream which comes out through a chute. As in traditional techniques, the husk of bold grains like





Bengal gram and tur are loosened by soaking in water and sun drying. After milling in the machine, the dhal is separated by winnowing and sieving as in traditional process. Dhals, in yields of 75-80 per cent from Bengal gram and tur have been obtained. The cost of a unit is calculated to be about Rs. 3,500/- (Research and Industry 34(3), 1989, 213-216)

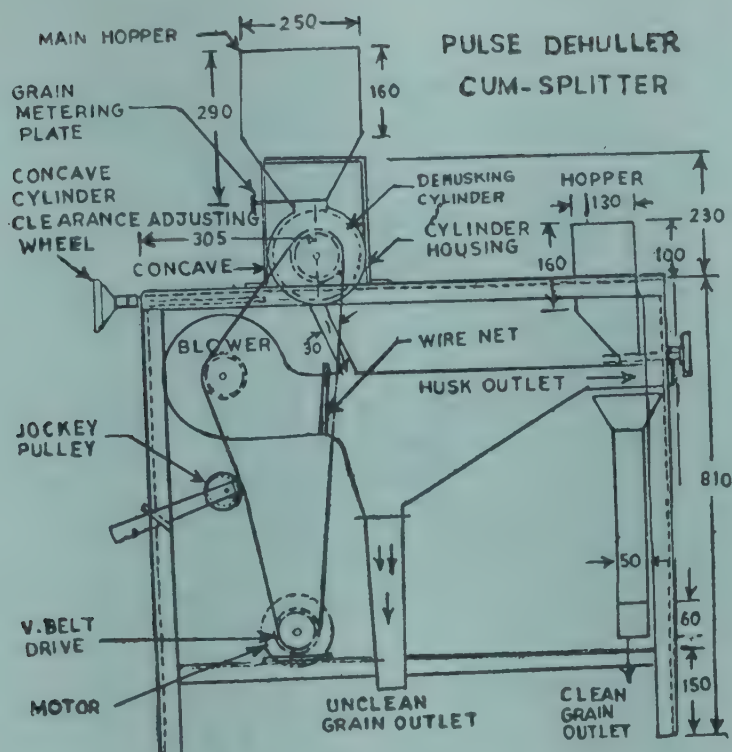
#### 84 Pulse dehuller-cum-splitter

Pulses are leguminous crops rich in protein. The protein content of pulses varies from 20 to 40%. Pulses form the cheapest source of supplementary protein in Indian diet.

A small capacity, low cost, simple and portable pulse dehuller-cum-splitter has been developed.

##### Mechanism

The machine consists of a cylinder-concave set, a feed hopper and a blower, as shown in the sketch. All these parts are fitted on a 25x25x6 mm mild-steel angle-iron frame of 915x470x810 mm size. Two mild-steel cylinders were fabricated, each 150 mm round and 225 mm long. The outer surface of the cylinders was made rough by coating with commercially available 36-mesh emery cloth, knurling and serrations. A concave made of 3 mm thick mild-steel plate having the same curvature as the cylinder and with 1x1 mm (widthxdepth) grooves along its length spaced 25 mm apart is provided below the cylinder. The concave covers about 1/4th of the circumference of the cylinder, the rest of which is covered with 18-gauge mild-steel sheet. The clearance between the cylinder and the concave is adjustable by forward and backward movement of the concave.



To facilitate separation of hull from the mixture of dal, unhusked pulse and husk, a blower with duct is provided with the machine.

For details contact: D.V.K. Samuel, Division of Agricultural Engineering, Indian Agricultural Research Institute, New Delhi - 110 012.  
(Invention Intelligence, February 1990, 88-89)

## 85 Soybean snack extruder

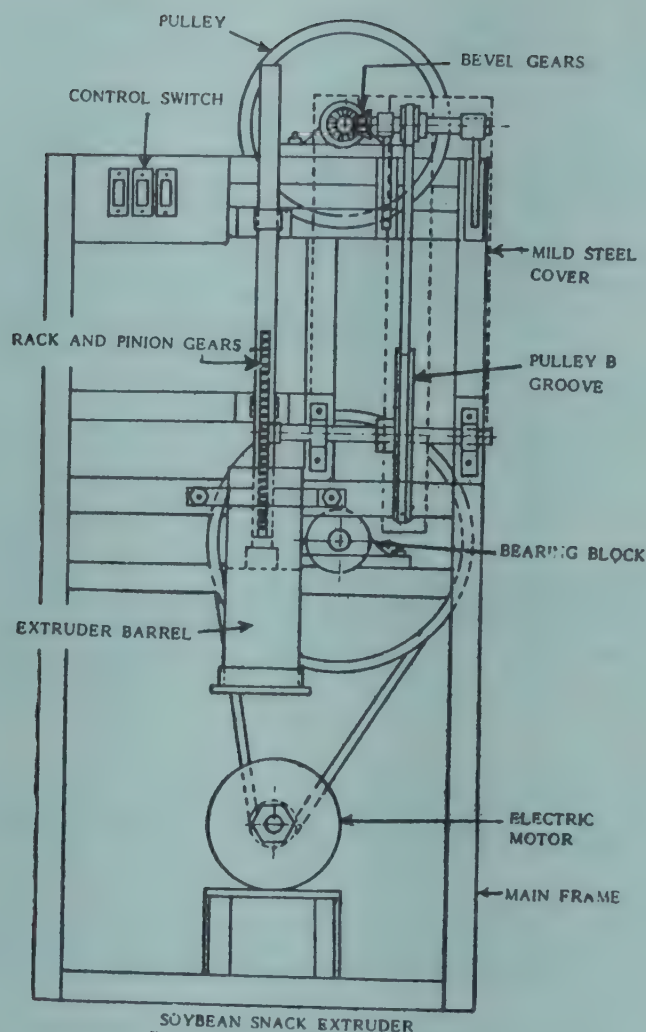
Scientists at the Central Institute of Agricultural Engineering, Bhopal, have developed and evaluated an extruder for making different snacks. Due to problems of digestibility and flavour, soybean is not utilized for multiple snacks. On the other hand, Indians do prefer snacks made from rich and sago palm (rich in starch). So, by mixing soyflour with the flour of rice and sago palm the total protein content could be increased.

Preparation of baked products (bread, cake, biscuits, etc) from soyblend slurry of soybean, rice and sago palm needs an extruder. The machines used for this purpose at present are not suitable or up to the mark and lead to drudgery.

The overall dimensions of the machine are 1,200x680x510 mm (see sketch) and it weighs about 62 kg. It requires a 370 w motor and one operator. Its cost, including electric motor, comes to Rs. 3,200.

Soybean of good quality is cleaned and milled in a burr-mill to prepare soydal. The flours of soydal, rice and sago are mixed in desired proportion. Water is added to it at the rate of 400 ml, for 100 gm blended flour.





The salt, cumin, etc are mixed to it and the slurry cooked in a vessel for 1.5 minutes to make it a thick pasty substance. After cooling down, the paste is ready for extrusion.

The soyblend slurry is placed inside the barrel. The piston moves with a speed of 0.7-1.0 cm/second from top to bottom. By pressing the slurry it extrudes the snacks through the die. The extruder barrel is 75 mm in diameter and 280 mm in length. The die (of different size or shape) can be changed according to consumers' demand. Generally, the die used for this is 0.5 mm thick and 5.00 mm in diameter. About 1 kg cooked material (slurry) can be fed into the barrel at a time.

The capacity of this equipment is about 34 kg/hr, whereas that of hand-press machine is only 1.5-2 kg. The cost of extrusion of 1 kg cooked material comes to Re.0.30 only. The instant snacks prepared by this equipment were liked in experimental trials. It is now ready for large scale popularization among soybean growing farmers. (Invention Intelligence, February 1990, 56-57)

## 86 Twin roll decorticator for sunflowerseed

Double drum huller is generally used for high capacity hulling, i.e. if the capacity of hulling required is more than one ton per hour. A centrifugal type impact huller can be used if the capacity required is less than 500 kg/hr. The double drum huller is usually

preferred over centrifugal disc type impact huller in case the capacity of huller required exceeds 500 kg/hr.

The undecorticated seeds are uniformly fed to the two stage roll crusher through rotary feeder.

The hulling unit consists of upper and lower twin rolls, each set of rolls rotating in opposite direction at differential speed. The roll diameter will be within 200 to 300 mm depending upon the capacity of machine and geometry of seeds to be dehulled. The length of roll would be within 500 to 700 mm. The roll will rotate in the range of 750 to 1000 rpm and the low speed one will rotate in the range of 400 to 750 rpm. The differential speed of rolls help in pulling down the seeds through the cracker which is required to ensure downward movement of the seeds through cracker. It may be noted that the rolls are corrugated at the surface.

The material is fed through the sharp edge of the corrugation and cracked to decorticate the seeds. The distance between two rolls can be adjusted (one is fixed and another is adjustable one) by mechanical or hydraulic means according to the specified size of the final product.

Each set of rolls is driven by two separate motor. The proper design of corrugation would be of immense importance since it substantially effects the performance of hulling operations. Probable specifications of proposed huller will be as:-

Capacity of huller	-- 2 Ton/hr
Dehulled seeds	-- 95%
Fines	-- Less than 5%
Size	-- + 30 mesh
Residual oil in hull	-- less than 1%
Primary drive motor	-- 5-7.5 H.P. (2 motors)
Variable speed feeder motor	-- 1 HP
Roll diameter	-- 200 to 300 mm
Length of roll	-- 500 to 700 mm
Roll distance adjustment	-- Hydraulic/Pneumatic/ Mechanical

Interested members are requested to contact: Dr.N.C.F. Shah, Scientist-in-charge, Mechanical Engineering Research and Development Organisation, NCL Campus, Pashan Road, Pune-411 008.  
(SEA News Circular 3(15), 1990, 28-29)

## 87 Groundnut decorticator

A special machine for use by small farmers as well as traders for shelling out groundnut seeds or kernels has been developed. The machine can be hand operated, or can be powered by a one horsepower AC electric motor of 230 V.

Throughput capacity of the machine is 50 kg/hour. Several models are already in operation in India, and some machines have been exported to Pakistan, the UK and Middle East countries, in cooper-



ation with the UN Food and Agriculture Organisation. The company also manufactures larger powered decorticators, agricultural implements, grinding mills and knife grinders amongst other things.

For details, contact: Dandekar Brothers, Shivajinagar, Sangli-416 416, Maharashtra, India.  
(Asia-Pacific Tech Monitor September-October 1989, 26-27)

## 88 The flow meters for the food processing industry

New flow meters for precision measuring of volume flows in hygienic applications for instance at dairies, breweries and elsewhere in the food processing industry has been developed by the Finnish company Koltek Oy, which through ownership by the Danish for LKW now belongs to the Afa Laval Flow group of companies. Applications can also be found in the chemical and paper industries.

The meters in the new K11 series are each equipped with a detector for picking up and transmission of electronic pulses. Thanks to a standard three-wire coupling the meter can be used in connection with various industry-standard control systems and reading instruments. The pulses are generated by a permanent magnet mounted on the meter's rotating ring piston. The ring piston's rotation corresponds to a certain volume flow, and therefore the frequency of pulses is in direct proportion to the flow rate.

Because the pulse detector has no moving parts the meter is reliable, moisture-proof and easy to install. Output signals can be calibrated to various types of reading instruments. The flow can be measured in both flow directions, and the meter is installed either in a horizontal or a vertical position. The distance between the meter and the reading equipment can be up to 1,000 meter. The meters are suitable for liquids and suspensions within a viscosity range from 0.5 to 2.000 cP. They need not be disassembled for cleaning.

For further information please contact: Koltek Oy, Box 18, SF-01231, Vantaa, Finland.  
(Chemical Weekly 35(29), 1990, 101-102)

## 89 Evaporators

Alpen Evaporators are designed for liquid-liquid separation for recovery of one of the constituents or concentration of one constituent in a mixture of liquids. They find applications in the chemical, pharmaceutical, drug, food processing, sugar, fruit juice, vanaspati, and milk segments of the process industry. The models offered are: Calendria type, boiling pan/concentrator, agitated thin-film and falling film evaporator. They are offered in carbon and stainless steels in single and two stage versions, with operating temperatures up to 250 C and pressures up to 15 kg/sq cm (for steam heating), as also up to near-vacuum. Vapour-liquid separation, where required, is achieved through the use of demister pad when there is no possibility of fouling by solids in the liquor.

For more details write to: Alpha Process Engineers, 6 Park Avenue, K.P. Puram, Madras 600 028.  
(Chemical Products Finder 8(10), 1990, 127)

## 90 Rotary pouch sealing machine

Plasto Pack manufactures Rotary Pouch Sealing Machines suitable for sealing virgin as well as laminated pouches. These machines are compact, sturdy and can be accommodated in the packaging line of any industry. The pouches filled with products are kept on a conveyor which carries them to the sealing port where rotating rollers seal the pouches and then carry them away. Optionally grippers are provided to hold the pouch vertically for exact positioning at the sealing port. FHP motors drive the sealing rollers and conveyors. The speed of the conveyor and sealing port is synchronized with the speed regulator. Output from these machines vary from 1,000 to 1,500 pouches per hour depending on the thickness and nature of the pouch material. The machines are designed to operate either on 230 V or 110 V AC, and can be mounted on a table. The height between the sealing port and the conveyor can be easily adjusted to suit various pouch sizes. User areas include: pharmaceutical, chemical, food and engineering industries.

For further information write to: Plasto Pack B-15 Mugappair Industrial Estate (West), Madras 600 050.  
(Industrial Products Finder 18(6), 1990, 215)

## 91 Rotary type cup filling machine

Panpack Marketing offers an automatic rotary type cup filling machine for use in food and pharmaceutical industries. It can handle plastic cups of different sizes and shapes. The machine is ideally suited for filling ice cream and can also be used for jam, honey, oil, margarine, yoghurt, fruit juice, soft drinks, and cream.

For more details write to: Panpack Marketing, P.B. No.48, Panchal House, Near Municipality Office, Anand, Gujarat 388 001.  
(Chemical Products Finder 8(9), 1990, 127)

## 92 Bottle washing machine

Designed to clean bottles/vials of various types and sizes, the PSE rotary machine has four separate stations for inside jet wash. The stations can be connected to clean the containers with various washes like detergent, hot water, demineralised water and compressed air or distilled water. The machine has a facility for outside spray wash. It is provided with a panel board for operating mechanism and to control the temperature of hot water which can be maintained up to



60 C fitted with a heater of 6 kW. Suitable for cleaning various types of bottles from 15 to 750 ml, the machine is fitted with 0.5 HP 3-phase electric motor along with reduction gearbox for main drive. Output is 50-70 bottles a minute, depending on the size of the containers.

For more details write to: Pharmaceutical and Surgical Equipments, Zillawadi, Suren Road, Near Darpan Cinema, Andheri (East), Bombay 400 093.  
(Chemical Products Finder 8(8), 1990, 59)

### 93 Dehumidifier/air dryer

The Bry-Air compact dehumidifiers remove moisture from the air through a process of continuous physical adsorption. These are based on the concept of desiccant dehumidification where the desiccant can be continuously regenerated for an indefinite period and can maintain relative humidity at 1% or even lower. The equipment is available in 23 standard models with different drying capacities. The compact units come in 3 models - 50, 100 and 150 CFM. These models, being light in weight, can be mounted in different positions - floor, table-top, wall bracket and ceiling suspended. The Bry-Air dehumidifiers find applications for drying of seeds, milk, tea, coffee, packaging of biscuits, powdery foods, etc.

For more details write to: Arctic India Sales, 20 Rajpur Road, Delhi 110 054.  
(Chemical Products Finder 8(8), 1990, 69)

### 94 Low-cost tray dryer

A low-cost tray dryer using agricultural wastes as fuel, which can be utilised in small-scale food processing industries for drying products at controlled temperatures has been fabricated at the Central Institute of Agricultural Engineering (CIAE), Bhopal. The tray dryer basically consists of a drying chamber and plenum chamber which is covered with an asbestos sheet on the sides and wire mesh at the top. A burning-cum-heat exchanging unit is housed in the centre of the plenum chamber.

The burning chamber is a galvanised iron sheet cylinder fitted with six pins for transfer. One end of the cylinder is open to take in the fuel which is burnt in the centre, while the other end is connected to a chimney having a butterfly valve for manual control of the temperature of the drying air.

The drying chamber is provided with an exhaust vent with an adjustable opening at the top, the report says.

The fuel, mostly agricultural waste and wood chips, is burnt in a welded wire mesh tray in the centre of the burning chamber. The high temperature of the flue gases heats the drums and the fins, and the heat is transferred to the surrounding air by radiation and convection.

The hot air comes in contact with the wet material as it moves upward. The moisture-laden air then escapes from the exhaust vent. The process creates a cycle of natural convection of air through the drying trays. The material is stirred frequently and the position of the trays interchanged to achieve uniform drying.

The dryer can take a load of 100 kg of wet material per batch. The dryer is estimated to cost Rs. 5700, with the cost of drying working out to be a mere 25 paise per kilogram which compares well with sun-drying. It also offers the additional advantages of improved material quality and drastic reduction in processing time. Besides, there is no need to expose the material to the open air for secondary drying which is required in the case of sun-drying.  
(P.T.I. Science Service 9(3), 1990, 4)

## 95 Low temperature drying systems

For products which are temperature sensitive, drying at high temperature deteriorates their quality. In such instances, the solution lies in surrounding the product with dry air without the risk of product spoilage. Bry-Air specialises in such types of low temperature drying at temperature below 75 F. Bry-Air dehumidifiers speed up product, drying by continuously removing moisture from the surrounding air by a process of physical adsorption where the adsorbent used is a desiccant.

Bry-Air units are custom designed for specific requirements. They are available in different models with different drying capacities. Bry-Air dehumidifiers find applications in various industries where low temperature drying is required like drying of cocoa, gelatine, yeast, coffee powder, flour, starches, katha, onions, in processing powdery foods like soft drink concentrates, milk powder, sugar, in packaging and storage of biscuits, wafers, snacks and in breweries and distilleries where mold and mildew formation is prevented in hop storages, yeast rooms, fermentation and keggings areas.

For more details contact: Arctic India Sales, 20, Rajpur Road, Delhi 110 054.  
(Chemical Weekly 35(28), 199, 110)

## 96 Double-drum dryer

Pragati Engineering Works has introduced a double-drum drying system for efficient removal of water and solvents from a wide variety of solutions and suspensions. It is said that this type of drying system is most economical for an endless list of chemicals, food, pharmaceuticals, etc. The feed stock is introduced into twin steam-heated drum in a uniform film by the use of a variety of feeding devices and arrangements depending upon the material to be dried.



The moisture is driven off in less than one revolution of the drum and the resultant dried solid is removed, usually in the form of thin-sheet, by a scraper blade. The dryer is suitable for applications in anhydrous sodium sulphate, barium hydrate, calcium acetate, DDT, etc.

For more details write to: Pragati Engineering Works, Shed No. W 88, A/N 8 Industrial Estate, Chikhaloli, Ambarnath, Maharashtra 421 505.

(Chemical Products Finder 8(10), 1990, cover page)

#### 97 Sigma mixer (Kneader)

Paresh offers a high efficient heavy duty Double Arm Mixer (Kneader), specially designed for uniform mixing and kneading heavier viscosity materials such as stiff pastes, different kinds of dough, adhesive polyester, premixes, flush colour and brake lining compound. The tangential action of mixing and kneading will be thoroughly obtained by 'Z' shaped spiral kneading blades having very close clearance to the vessel walls, thus kneading material will not stick to inside walls of trough. Blade is manufactured from graded cast steel/stainless steel. The mixer is neat in appearance and takes much less time to produce. Container tilting will be manual or motorised and if desired discharge facility at bottom will be provided. If required, the mixing trough will be jacketed and hydraulically tested for heating, cooling purpose and vacuum facilities. The mixer is suitable for use in industries such as chemical, pharmaceutical, confectionery, rubber, detergent, food, paint, etc. The mixer is available in working capacities ranging from 4.5 litres to 1,200 litres, in mild steel or stainless steel construction.

For more details write to: Paresh Engineering Co., 74B, Sanjay Building No.5, Mittal Industrial Estate, M Vasanji Road, Marol Naka, Andheri (East), Bombay 400 059.

(Chemical Products Finder 8(8), 1990, 9)

#### 98 Food belts

Volta International, USA, has developed a hi-tech custom blend of polymers offering an unusual combination of characteristics such as high strength, low stretch, cut resistance and flexibility. Volta Food Belts are homogenous, with no plys to come apart. They can be made endless quickly with a unique welding process, using simple tooling. They are highly sanitary due to a smooth non-porous surface on both sides. These food belts are accepted by the USDA/FDA-USA; Food Production and Inspection Branch - Agriculture, Canada; and BGA, Germany. Volta food belts can be fabricated easily to meet the needs from standard roll widths of 60". Longitudinal splices, V-guides and a wide variety of cleats, thermowelded to a Volta flat belt, give added versatility and performance. Applications are in meat, fish, and poultry processing; fruit and vegetable canning; cheese processing; food packing and processing; frozen food processing; bakeries; chocolate, snack foods and ice cream production; and pharmaceutical industry.

For further information write to. Simplicity Projects Pvt Ltd.,  
17 Community Centre, Mayapuri, Phase 1, New Delhi 110 064.  
(Industrial Products Finder 18(5), 1990, 155)

## 99 Pumps for beverages industry

The Series NU pumps from Netzsch Mohnopumpen GmbH, West Germany, are used mainly in the beverages industry, but also wherever pumps do not have to operate under extremely difficult conditions. They are particularly attractive, of short design, and directly flanged to the drive unit (electric motor, gear motor, or variable speed gear unit). They are available for outputs upto 150 m<sup>3</sup>/hr. and pressure heads upto 12 bar.

For further information write to: Techman Tara Universal, 308, TTK Road, Madras 600 014.  
(Industrial Products Finder 18(6), 1990, 219)

## 100 Pulverisers

Batliboi offers a range of pulverisers and hammer mills for application such as disintegration, fine grinding, granulating, deagglomeration and fiberising. These systems are extremely versatile for pneumatic and mechanical handling of materials in different sizes without intermittent handling of materials between the processes.

The company also offers complete spice grinding plants comprising cleaning, pulverising, mixing and packaging systems. The various stages of operation of these plants are cleaning of spices by eliminating particles and impurities and thereafter pulverising the same through high-tech system with autoservo control to monitor the feed rate uniformly. This minimises checking as well as clogging of the oil based materials. It also includes a built-in heating system which obviates the conventional sun drying process. A sieving machine ensures separation of coarse and fine powder.

Subsequently the mixing operation takes place and then dosing and packing in a fully automatic packing machine.

For more details quote Ref No. PUB/PR/21/90 and write to Batliboi and Company Ltd., P.Box 479, Bombay-400 001.  
(Financial Express 22 April 1990, 6)

## Packaging

## 101 Flexible packaging film for food

Scharr Industries, Inc. manufactures metallized film for packaging food products such as candy, snack foods, and coffee. It



is said to offer excellent MVTR and O2TR barrier and a light barrier that prevents oxidative rancidity. Its bright foil appearance, high slip, high resistance, and flexibility combine to make it a material that results in attractive laminations.

For more details write to: Scharr Industries, Inc, 40 E Newberry Road, Bloomfield, Connecticut 06002, U.S.A.  
(Chemical Products Finder 8(10), 1990, 132)

#### 102 New aluminium foil retort packaging system

Toyo Aluminium of Japan has marketed a new aluminium foil retort packaging system "Al-Elepouch", which can be heated in a microwave oven. This packaging system consists of a transparent plastic film pouch covered with a layer of a strippable aluminium foil/heat-resistant plastic film laminate envelop. The pouch, designed to stand upright, turn microwave-heatable when the outer layer of aluminium foil is peeled off.

For details, contact: Toyo Aluminium Co., 25-1, Minami Kyutaro-machi, 4-chome, Higashi-ku, Osaka-541, Japan.  
(Asia Pacific Tech Monitor September-October 1989, 27)

### Analysis

#### 103 New rice aroma estimation

A Gujarat-based agroscientist has developed a new quick method to estimate the aroma of a rice variety by determining its volatile carbonyl constituents.

The major carbonyl compounds present in rice are acetone, hexanal, branched ketones, heptanal, octanal, nonanal and phenylacetaldehyde. Another carbonyl compound 2-acetyl-1-pyrroline is found ten-fold in scented rice varieties compared to non-scented varieties.

A team of scientists headed by Dr. M.K. Chakraborty at the Gujarat Agricultural University, Anand, has developed a new technique that estimates the aroma of leaves of seven-week-old plants. At this stage, the rice plants complete tillering and grain setting starts.

The method makes use of a thermostat-controlled water bath maintained at 40°C, nitrogen gas cylinder, nitrogen gas bubbler, a two-necked round bottom flask, a glass column with activated charcoal, and water-jet filter pump for mild suction.

Addition of potassium hydroxide to an aqueous suspension of the leaves maintained in a flask in a water bath liberates the volatile constituents. The vapours are trapped by activated charcoal in a glass column for about an hour. The absorbed volatiles are leached

out into a flask by eluting with a solvent mixture containing equal amounts of peroxide-free diethylether and carbonyl-free methanol. A sensory test of the eluent indicates the fragrance of the variety.

A person can analyse about 25 samples in a day and already scientists in the Gujarat Agricultural University have analysed many rice varieties using this technique.

(P.T.I. Science Service 9(3), 1990, 5-6)

## Commercial Intelligence

### Production (Raw Materials)

104 Estimates of production of total oilseeds

State/Union Territories	(Thousand Tonnes)	
	1986-87	1987-88 (Final)
Andhra Pradesh	1436.3	1853.4
Arunachal Pradesh	15.5	15.5
Assam	160.5	179.9
Bihar	124.3	118.5
Gujarat	1674.1	401.2
Haryana	226.3	333.0
Himachal Pradesh	5.3	3.3
Jammu and Kashmir	62.6	39.7
Karnataka	1256.4	1570.6
Kerala	9.4	7.9
Madhya Pradesh	1251.6	1464.9
Maharashtra	838.1	1248.4
Manipur	2.9	2.9
Meghalaya	5.5	5.5
Mizoram	1.4	1.5
Nagaland	11.3	6.4
Orissa	798.9	849.6
Punjab	166.4	235.9
Rajasthan	882.6	1230.1
Sikkim	11.4	12.1
Tamil Nadu	1138.2	1324.4
Tripura	4.3	6.0
Uttar Pradesh	916.7	955.6
West Bengal	263.8	506.2
Dadra and Nagar Haveli	0.1	0.1
Delhi	0.3	0.4
Pondicherry	5.5	5.3
ALL-INDIA	11269.7	12378.3

(The Oils and Oilseeds Journal 41(10-12), 1989, 20)



- 105 The estimated production of oilseeds and vegetable oils during 1988-89 crop year

(In Million Tonnes)

Oilseeds	Estimated Production			Used for sowing/ edible purposes		Balance	Oil re-	Estimated
	Kharif	Rabi	Total	in %	in quan- tity	marketable sur- plus	covery %	produc- tion of oils
Groundnut in shell	5.700	2.000	7.700	20	1.540	6.160	29	1.786
						(on in-shell basis)		
Mustard-Rapeseed/Toria	0.000	4.000	4.000	2	0.080	3.920	35	1.372
Sesameseed	0.550	0.200	0.750	10	0.075	0.675	40	0.270
Sunflowerseed	0.250	0.400	0.650	2	0.013	0.637	30	0.191
Soyabean	1.700	0.000	1.700	10	0.170	1.530	17	0.260
Safflowerseed	0.000	0.500	0.500	5	0.025	0.475	23	0.109
Nigerseed	0.200	0.000	0.200	2	0.004	0.196	30	0.058
Linseed	0.000	0.450	0.450	2	0.009	0.441	38	0.168
Castorseed	0.400	0.000	0.400	5	0.020	0.380	40	0.152
TOTAL	8.800	7.550	16.350		1.936	14.414		4.366

(The Oils and Oilseeds Journal 42(1-3), 1989, 40)

- 106 Estimated production (availability) of vegetable oils during 1988-89 crop year

Supply

(In Million Tonnes)

1. Oils from cultivated oilseeds		4.366
2. Coconut Oil		0.250
3. Rice Bran Oil		0.350
Edible Variety	0.175	
Non-Edible	0.175	
4. Cottonseed Oil		0.350
5. Solvent Extracted Oils from Oilcakes		
Groundnut oilcake	0.070	
Rapeseed-Mustard oilcake	0.060	
Cottonseed oilcake	0.015	
Sunflower oilcake	0.040	
Miscellaneous oilcakes	0.015	0.200
6. From oilseeds of forest origin		
Salseed	0.015	
Mowrah	0.020	
Neem	0.030	
Others	0.010	0.075
7. Acid oils		0.100
TOTAL		5.691

(The Oils and Oilseeds Journal 42(1-3), 1989, 37)

## 107 Rice bran oil production

(In tonnes)

Year	Edible	Non-edible	Total
1985-86	32,850	1,85,055	2,17,900
1986-87	94,950	1,62,150	2,57,100
1987-88	1,45,000	1,45,000	2,90,000

(The Oils and Oilseeds Journal 42(1-3), 1989, 32)

## 108 Requirement and production of vegetable oils and vanaspati

In reply to a question in Rajya Sabha on July 28, 1989, the Minister of Food and Civil Supplies, Shri Sukh Ram, stated that the total requirement and production of vegetable oils during the last three years are as under:-

Year (Nov-Oct)	(Qty. in lakh tonnes)	
	Requirement	Supply
1986-87	48.45	33.48
1987-88	54.68	37.67
1988-89	55.34	47.80*

(1) The figures include the oil required for the manufacture of vanaspati also.

(\*) Based on an estimated oilseeds production of 160 lakh tonnes.  
(The Oils and Oilseeds Journal 42(1-3), 1989, 28)



## 109 World aquaculture production of shrimp, 1989

Country	% of world production	Heads on production (metric tons)	Hectares production	Kilograms/ Hectare
China	29	165,000	145,000	1,138
Indonesia	16	90,000	250,000	360
Thailand	16	90,000	80,000	1,125
Philippines	9	50,000	200,000	250
Ecuador	8	45,000	70,000	643
Vietnam	5	30,000	160,000	187
India	4	25,000	60,000	416
Taiwan	4	20,000	4,000	5,000
Central America and Caribbean	2	12,000	12,000	1,000
South America (excluding Ecuador)	1	7,000	8,000	875
Others	5	30,800	103,300	298
Total		564,800	1,092,800	517

(The Economic Times 21 April 1990, 4)

## 110 Egg production

India has emerged as the fifth largest egg producing country in the world with the current national output touching 20,000 million eggs annually, the Union Agriculture Secretary, Mr.S.K.Mishra, said here on Tuesday.

(Financial Express 1 February 1990, 5)

## Production (Industrial)

## 111 Sugar production

According to the Indian Sugar Mills Association the sugar production during the month of February, 1990 was about 17.72 lakh tonnes as against 17.19 lakh tonnes during the same month last year. This brings the total output during the season 1989-90 to 65.07 lakh tonnes as against 59.69 lakh tonnes during the corresponding period last year.

The closing stock of sugar as on 28.2.90 was 38.45 lakh tonnes comprising of 37.80 lakh tonnes indigenous sugar and 0.65 lakh tonnes of imported sugar in all, inclusive of stocks held at the ports and the FCI godowns at different consuming centres. The corresponding figure of stock on the same date last season was 42.27 lakh tonnes comprising of 42.12 lakh tonnes indigenous sugar and 0.15 lakh tonnes of imported sugar.

(Indian Sugar Mills Association, Press Release, 22 March 1990)

## 112 Soft drinks production

Soft drinks production in the country has doubled from 3,200 million bottles in 1985 to 6,500 million bottles in 1989 registering an impressive growth rate of 26 per cent.

The soft drinks market in the country crossed the Rs. 900 crore-mark during 1989.

The organised sector accounting for 48 per cent of the total production during the year. However, in terms of value it accounted for 67 per cent.

Although the Indian soft drink industry is one of the largest in the world, the per capita consumption is as low as eight bottles per annum.

(Deccan Herald 11 February 1990, 14)



## Export

## 113 Exports of oilseeds, oilmeals and oils/fats 1987-88, 1988-89 (Est.) &amp; 1989-90 Target\*

Sr. No.	Commodity	1987-88		1988-89 Provisional		1989-90* Target	
		Quantity M. T.	Value Rs. Cr.	Quantity M. T.	Value Rs. Cr.	Quantity M. T.	Value Rs. Cr.
1.	HPS Groundnut	4,800	5.00	37,000	35.00	50,000	50.00
2.	Sesameseed	-	-	18,000	20.00	30,000	30.00
3.	Nigerseed	6,800	7.00	13,000	13.00	12,000	12.00
4.	Kardiseed	-	-	-	-	10,000	7.00
5.	Castor Oil	33,000	48.00	45,000	75.00	60,000	100.00
6.	Soya Ext.	3,11,300	86.00	6,87,500	266.00	9,00,000	350.00
7.	Groundnut Ext.	2,89,000	71.00	2,50,000	50.00	3,50,000	70.00
8.	Cottonseed Ext.	23,000	4.50	15,000	3.00	25,000	5.00
9.	Rice Bran Ext.	3,53,000	28.00	3,90,000	36.00	5,50,000	55.00
10.	Rapeseed Ext.	43,800	4.00	1,25,000	20.00	3,00,000	45.00
11.	Sunflower Ext.	38,600	4.00	75,000	10.00	1,00,000	13.00
12.	Sesame Ext.	9,500	2.00	20,000	4.50	50,000	11.00
13.	Salseed Ext.	24,000	1.50	20,000	1.50	25,000	2.00
14.	Mango Kernel Ext.	-	-	22,000	3.00	25,000	4.00
15.	Other Extractions	5,000	1.00	5,000	1.00	10,000	2.00
16.	Mango/Sal/Kokum fats	2,500	6.00	1,500	4.00	5,000	12.00
TOTAL		11,43,800	268.00	17,24,000	542.00	25,02,000	768.00

\* Subject to normal production, price parity and grant of various incentives.  
(The Oils and Oilseeds Journal 41(10-12), 1989, 27)

## 114 Export of oilseeds extractions

	1987-88		1988-89	
	Quantity (Tonnes)	Value (Cr.) Rs.	Quantity (Tonnes)	Value (Cr.) Rs.
Groundnut extractions	2.89 lakhs.	71	2.50 lakhs	50
Soyabean extractions	3.11 lakhs	86	6.92 lakhs	273
Rapeseed extractions	43,800	4	1.25 lakhs	20
Sesame extractions	9,500	2	20,000	4.50
Cottonseed extractions	23,000	4.50	15,000	3

(The Oils and Oilseeds Journal 42(1-3), 1989, 66)

115 Production of solvent extracted oils and export of extractions for the period 1.4.88 to 31.3.89 - 12 months and comparative period for last year 1987-88 (12 months) In Bracket  
PROVISIONAL

(Quantity in M.T.  
Amount in Rs.)

Sr. No.	Commodity Oilcake/ Seed/Bran	Production of S.E. oil					Export		
		Processed	Edible	Industrial	Total	Production of extrac- tion	Quantity	F.O.B.	Unit value
		M.T.	M.T.	M.T.	M.T.	M.T.	M.T.	Rs.	Rs.
1	2	3	4	5	6	7	8	9	10
							Export of Extractions		
1.	Rice Bran	2081896 (1940476)	124306 (118647)	174415 (159378)	298721 (278025)	1766119 (1649793)	3,88,046 (3,52,751)	3599,18,817 (2802,67,322)	927 (794)
2.	Sunflower oilcake	200408 (181113)	18449 (15820)	5620 (6960)	24069 (22780)	176576 (157848)	75,886 (38,614)	982,39,358 (385,67,038)	1294 (998)
3.	Rapeseed oilcake	331151 (259685)	22036 (18185)	6229 (6347)	28265 (24532)	300218 (233099)	1,21,223 (43,319)	1725,70,075 (400,81,833)	1423 (925)
4.	Salseed	48979 (84151)	351 (3081)	5911 (7671)	6262 (10752)	41995 (71412)	21,517 (23,884)	173,02,490 (144,00,834)	804 (602)
5.	Mango kernel	21590 (6657)	- (-)	1945 (600)	1945 (600)	18977 (5706)	20,459 (-)	260,18,323 (-)	1271 (-)
6.	Mañua oilcake	54661 (70771)	10 (229)	4681 (6503)	4691 (6732)	48875 (62521)	56 (16)	2,10,748 (55,572)	3763 (3473)
7.	Kokum oilcake	- (369)	- (-)	- (41)	- (41)	- (322)	- (-)	- (-)	- (-)
8.	Kardi oilcake	21890 (32298)	1211 (1174)	560 (1429)	1771 (2603)	20529 (29788)	- (-)	- (-)	- (-)
9.	Sesame Seed oilcake	43885 (21579)	2513 (1099)	1235 (638)	3748 (1737)	39903 (19938)	17,770 (9,454)	401,98,550 (214,58,270)	2262 (2269)
10.	Nigerseed oilcake	242 (4425)	13 (153)	- (284)	13 (437)	225 (3959)	- (-)	- (-)	- (-)
11.	Copra oilcake	40275 (34562)	730 (647)	2609 (2315)	3339 (2962)	37217 (31583)	- (-)	- (-)	- (-)
12.	Kusum seed	595 (1772)	- (-)	71 (208)	71 (208)	469 (1562)	- (-)	- (-)	- (-)
13.	Karanja seed	5282 (9048)	- (-)	602 (972)	602 (972)	4658 (8038)	- (-)	- (-)	- (-)
14.	Maize seed	293 (585)	- (12)	39 (86)	39 (98)	250 (484)	- (-)	- (-)	- (-)
15.	Tumba seed	726 (-)	- (-)	36 (-)	36 (-)	698 (-)	- (-)	- (-)	- (-)
16.	Ambadi seed	1602 (1250)	- (50)	80 (-)	80 (50)	1482 (1221)	- (-)	- (-)	- (-)
17.	Palsa seed	54 (949)	- (-)	3 (94)	3 (94)	48 (836)	- (-)	- (-)	- (-)



1	2	3	4	5	6	7	8	9	10
18. Peanut Meal	-	-	-	-	-	-	-	-	-
	(-)	(-)	(-)	(-)	(-)	(-)	(108)	(7,32,618)	(6783)
19. Palm Kernel	-	-	-	-	-	-	3,083	32,37,150	1050
	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
20. Others	1341	-	179	179	1093	-	-	-	-
	(416)	(-)	(26)	(26)	(387)	(-)	(-)	(-)	(-)
21. Sal Oil*	-	-	-	-	-	-	1,157	261,11,311	22568
	(-)	(-)	(-)	(-)	(-)	(-)	(1,558)	(376,13,638)	(24142)
22. Mango Kernel*	-	-	-	-	-	-	220	60,03,986	27290
oil	(-)	(-)	(-)	(-)	(-)	(-)	(722)	(192,18,067)	(26617)
23. Kokum oil*	-	-	-	-	-	-	111	32,60,392	29372
	(-)	(-)	(-)	(-)	(-)	(-)	(159)	(48,50,000)	(30503)

\* Exports of fats (oils)

(The Oils and Oilseeds Journal 41(10-12), 1989, 35-37)

## 116 Gingelly seeds export jacks up oil prices

Large-scale export of gingelly seeds has resulted in a flare-up of its oil price in Tamil Nadu in the last few months.

It is said that export of the seeds during the current crop year is projected to cross one lakh tonnes as against 40,000 tonnes last year. Out of this, 75,000 tonnes have already been exported, according to trading circles.

Consequently, the price of a bag (75 kg) of gingelly seeds has shot up from Rs. 740 in October last to Rs. 1,300 now in the State. The price of its oil has also gone up in tandem, from Rs. 380 to Rs. 530 per 15 kg.

(Financial Express 25 April 1990, 4)

## 117 Spices export cross target

Spices exports during 1989-90 has earned foreign exchange of Rs. 274.36 crores with the exports crossing the target of 86,700 tonnes according to a Spices Board press release, PTI reports.

While the total exports of spices which was 99,886 tonnes during the period registered an increase, pepper which constitutes the bulk of the spices exports had fallen below the target. Pepper exports during the year was 36,600 tonnes as against the targetted 42,000 tonnes, the release said.

The primary reason attributed to this was the low production of just around 45,000 tonnes during the season, compared to the 1988-89 output of 65,000 tonnes.

Besides, the earning through pepper exports had also dropped to Rs. 159.87 crores from Rs. 188 crores recorded last year owing to increased global competition and fall in international price of the product.

In small cardamom, domestic prices ruled at twice the level of international prices throughout the year which made export impossible. The level of USSR buying of small cardamom during the current year was also negligible. Cardamom exports were a mere 171 tonnes during the year against the targetted 350 tonnes, the release said. (The Economic Times 25 April 1990, 2)

#### 118 Rice export

India exported rice worth Rs. 297.17 crores during April-September (1989-90) which is 91.6 percent more than the exports of Rs. 155.06 crores during the corresponding period in 1988-89.

In quantity terms, 3.06 lakh tonnes were exported in the same period as against 1.90 lakh tonnes in the corresponding period last year (1988-89) registering an increase of 62 per cent.

During 1988-89, rice exports were of the order of Rs. 331.47 crores which was 2.1 per cent higher than Rs. 324.57 crores in 1987-88.

Basmati rice export during 1988-89 was of the order of 3,49,687 tonnes valued at Rs. 333.53 crores as against an export of 3,66,111 tonnes valued at Rs. 339.98 crores during 1987-88.

The major importers of Indian basmati rice are the Soviet Union, the United Kingdom and the Gulf region. (The Economic Times 18 April 1990, 2)

#### 119 Export price for basmati rice

The Union government has decided to fix the minimum export price for basmati rice at Rs.9,500 per tonne (F.O.B.) with immediate effect, according to an official release. Under the import-policy for 1990-93, the government had allowed export of basmati rice under open general licence (OGL) subject to minimum export price. (The Economic Times 19 April 1990, 4)

#### 120 CCS for cashew exports

The Centre has decided to grant cash compensatory support (CCS) on the export of certain agricultural products and processed food items including cashews, according to Cashew Export Promotion Council of India (CEPCI).



The eight per cent CCS granted on export of roasted salted cashew kernels is for the consumer packs of one kg or less. This will be applicable to exports effected in pursuance of offers/orders/contracts received and finalised on or after January 5, 1990 and will be valid upto March 31, 1992.

In November, the prices for wholes advanced marginally, while it declined sharply for brokens. The export price for wholes averaged at Rs. 82.40 per kg which was 0.05 per cent higher than the October 1989 price of Rs. 82.36 per kg and 1.24 per cent higher than the November 1988 price of Rs. 81.39 kg.

The export price for brokens averaged at Rs. 61.69 per kg which was 3.89 per cent less than the October 1989 price of Rs. 64.19 per kg and 3.61 per cent less than November 1988 price of Rs. 64 per kg.

During January-November 1989, the average unit price realised for wholes was Rs. 83.78 per kg., 2.6 per cent higher than the corresponding price of Rs.81.60 per kg in the previous year. But, in the case of brokens, the unit price at Rs. 62.95 per kg was less by 8.44 per cent than Rs. 68.75 per kg the previous year.

Imports during January-November 1989 thus remained at 34,437 tonnes valued at Rs. 464.2 million.  
(Economic and Commercial News 20(11), 1990, 9-10)

## 121 Cashew kernels export

Export of cashew kernels from India registered a growth of 37 per cent both in quantity and value in 1989, reports PTI.

During the period, exports totalled 43,880 tonnes earning an all time high of Rs. 354.65 crores. The previous high was Rs. 340.30 crores in 1987.

Exports to major markets like Australia, Canada, Kuwait, Netherlands, New Zealand, Singapore, the United States and the Soviet Union witnessed improved performance.  
(The Economic Times 26 April 1990, 3)

## 122 New norms for jaggery exports

The ceiling for export of jaggery has been placed at the disposal of Agricultural and Processed Food Product Export Development Authority (APEDA), according to a special procedure devised by the Ministry of Commerce.

The Import and Export Policy of 1988-91 permits jaggery exports against limited ceiling.

According to the new procedure, the exporters will have to register their contracts with the authority and submit bank guarantees.

The Authority will not allocate more than 5000 tonnes to any individual exporter unless he has irrevocable letter of credit. Exports will have to be compulsorily effected within 45 days of registration with the Authority. In case of failure, the registration will automatically be cancelled by the Authority.

The Authority will issue ceiling slips to the exporters fulfilling the required conditions on first-come-first-served basis indicating full particulars such as the name of the exporter, number and date of the order and the irrevocable letter of credit, quantity allowed, FOB value and the destination.

The Authority shall send release advice along with the bank guarantee to the Port Licensing Authority concerned which, on its receipt, will ensure that an export licence valid for, 45 days is issued within 48 hours.

According to the new procedure, APEDA will ensure that no registration takes place beyond September 30 and no licence with validity beyond that date is issued. The entire exports will have to be made within the validity period failing which the bank guarantee will be forfeited by the Government. The Authority is required to report to the Ministry of Commerce as soon as the ceiling is exhausted.

(Economic and Commercial News 20(11), 1990, 9)

## 123 Onion export

India exported 2,32,000 metric tonnes of onions between April 1989 and December 31, 1989. The export during the corresponding period of the previous year was 1,39,519 metric tonnes indicating growth of 66 per cent. The target fixed for 1990 is 300,000 metric tonnes.

NAFED is incidentally the canalising agency for the export of onions. The export is done under Open General Licence. Private trade also is eligible to export onions as Associate Shippers.

The share of NAFED in the total export of onions during 1989 was 23 560 metric tonnes. Efforts are underway to raise this to 50,000 metric tonnes during 1990.

(Economic and Commercial News 20(12), 1990, 7)

## 124 Record coffee exports

The Indian Coffee Board has achieved a record export of 145,000 tonnes till date during the year 1989-90 even as the domestic market has absorbed more than 63,000 tonnes so far, according to reports.

The Board signed two contracts with Soviet Union last month for the supply of 50 000 tonnes of green coffee and 5,000 tonnes of instant coffee worth nearly Rs. 1850 million.



For the 104220 tonnes export of the total 145000 tonnes for which figures were available India earned foreign exchange worth over Rs. 3040 million during 1989-90. The Government, it may be recalled has set an export target of Rs.4,000 million for the year.

The Board proposes to immediately explore prospects for export of instant coffee. It is of the opinion that India should be able to effectively compete in the international market in instant coffee produced from lower grades with use of aromatisation and other advanced techniques developed in this industry.

A programme for encouraging Research and Development in this context with the collaboration of instant coffee manufacturers is also likely. According to the Board, it should explore promotion of coffee consumption in non-traditional areas in a bigger way. It has decided to promote Research and Development of alternative uses such as coffee-based confectionery, coffee, colas, and decaffeinated coffee.

With regard to the uncommitted balance of coffee stock available with the Board till date amounting to 42,000 tonnes, the Board expects to dispose it before the current financial year by way of export as well as domestic sales.

(Economic and Commercial News 20(10), 1990, 7-8)

#### 125 Volume of exports of Indian tea

Year	Qty M. Kg	Value Rs. in crores	U/price Rs./Kg.
1983-84	202.30	557.55	27.56
1984-85	217.40	771.39	35.48
1985-86	222.92	674.24	30.25
1986-87	203.70	619.23	30.67

(Financial Express 24 April 1990, 10)

#### 126 Record export of marine products

The export of marine products has touched a new peak during 1988-89.

The country exported 158,000 tonnes of marine products worth Rs. 632.50 crore. This represents a growth of 61 per cent in volume and 20 per cent in value over the previous record of 97,900 tonnes valued at Rs. 525.11 crore in 1987-88, according to an official press release here.

Frozen shrimp continued to lead the list of marine exports with 57 per cent share in volume and 79 per cent in value the release said.  
(Deccan Herald 17 April 1990, 14)

## 127 Shrimp export

Year	Shrimp exports volume (tonnes)	value (in crore) Rs.	Unit value Rs./kg	Marine product exports	
				Volume (tonnes/crore)	Value Rs.
1986-87	49203	377.93	76.8	85843	460.67
1987-88	55736	425.78	76.4	97179	531.20
1988-89	56835	470.33	82.8	99777	597.85

(The Economic Times 21 April 1990, 4)

## 128 CCS for more items

The Government has granted cash compensatory support (CCS) ranged from five per cent to 22 per cent for the export of a number of items. The range of products includes agricultural and processed foods, chemicals and allied products, engineering and plastic goods.

The CCS is effective from January 5, according to a notification issued by the Ministry of Commerce. The concessions are valid up to March 31, 1992.

The food items and machinery eligible for CCS are: pressure cookers 10 per cent; biscuit making machinery eight per cent; dairy machinery including milk processing modules, cream separators, components and spare parts as well as tea processing machinery 10 per cent; mango juice, pineapple juice, guava pulp and concentrates, all eight per cent; papaya concentrates five per cent; strawberry jam, raspberry jam eight per cent; cashew kernels roasted and/or salted in consumer packs of one kg or less eight per cent; tamarind kernel powder/de-husked five per cent; pineapple titbits/slices eight per cent.

The CCS rates will be applicable to exports of these items in pursuance of offers/orders/contracts received and finalised on or after January 5, 1990.

(Economic and Commercial News 20(4), 1990, 10-11)

## 129 New Registering Offices for export of agro products

The Union Commerce Ministry has made changes in the registering authorities for the export of some agriculture items including extractions.

As per a public notice issued by the Chief Controller of Import and Exports on February 22, the registering authority for animal/poultry feed compound, mango kernel oil, salseed oil, rice bran extractions, and other items of extractions not mentioned elsewhere, the registering authority will now be the Solvent Extractors Association of India, Bombay.



For groundnut extraction, the registering authority will be the Groundnut Extraction Export Development Association, Bombay.

Similarly, Soyabean Processors Association of India, Indore, will be the registering authority of the export of soyabean extractions/meal while All India Cottonseed Crushers Association, Bombay will be the registering authority for Cottonseed extractions.

With regard to exporters of animal/poultry feed compound, mango, kernel oil and salseed oil, the registration-cum-membership certificate already issued by the Agricultural Products Export Development Authority, New Delhi, will continue to remain valid up to six months from February 22 or up to the date of its validity whichever is earlier, it was stated.

Similarly, with regard to other products the registration-cum-membership certificate already issued by the export promotion officers will continue to have validity up to six months from February 22 or up to the date of its validity, whichever is earlier. Thereafter, the registered exporters would be required to produce the registration-cum-membership certificates issued by the nominated authorities concerned.  
(Economic and Commercial News 20(10), 1990, 8)

### 130 Export documents simplified

The government today announced simplification of export documents to give the much needed relief to exporters. Apart from other relaxations, exporters would now have to prepare only two master documents, instead of the present 25, relating to pre-shipment of export cargo.

Adoption of the new documentation system is expected to enable the exporters to save at least 50 per cent of the time and cost presently spent by them on documentation. It will also help in expediting the decision-making process, virtually eliminate the chances of errors, and facilitate electronic transmission of documentation and data.

Currently, Indian exporters are required to submit about 25 documents to various agencies and authorities merely to ship the goods. Each document has to be individually prepared. The new system has sought to standardise these documents and also to align them to each other, on the basis of the United Nations key, which has been adopted by most of India's trade partners. Thus, instead of typing out 25 documents, an exporter would now have to prepare basically only two documents.  
(The Economic Times 15 February 1990, 1)

## Import

### 131 Import of palmolein

Palmolein is being imported from Malaysia and Indonesia.

The total quantity of Palmolein imported in the last 3 years.

Financial Year	Qty. MT
1986-87	6.02 lakh
1987-88	8.85 lakh
1988-89	5.20 lakh

(The Oils and Oilseeds Journal 42(1-3), 1989, 48)

### 132 Import of edible oil by the STC

Financial Year	Quantity (Lakh MT)	CIF value (Rs. crores)
1987-88	19.67	947
1988-89	10.89	765

Imports were made from USA, Brazil, Argentina, Canada, Malaysia, Indonesia and Europe by STC only.

(The Oils and Oilseeds Journal 42(1-3), 1989, 48)

### 133 No move to import sugar

The Government has no intention to import sugar this year in view of the good prospect of sugar production, according to an official release.

The statement follows reports in a section of the press that the Government proposes to import sugar this year.  
(Financial Express 12 April 1990, 1)

## Trade Information

### 134 Soft drinks in India

Soft drinks production in the country has doubled from 3,200 million bottles in 1985 to 6,500 million bottles in 1989, registering an impressive growth rate of 26 per cent, reports UNI from New Delhi.

This was revealed in a recent review on the soft drinks market by the Operations Research Group (ORG).

The soft drinks market in the country crossed the Rs. 900 crore mark during 1989.



Although the Indian soft drink industry is one of the largest in the world, the per capita consumption is as low as eight bottles per annum.

Aerated soft drinks are the most popular category, accounting for almost 80 per cent of the market. Tetra pack drinks introduced in the country in 1986 have a share of 10 per cent and the rest is accounted for by the non-aerated bottle drinks  
(The Times of India 12 February 1990, 6)

### 135 The world's ten top achievements in food technology

Food technology and food science have seen great developments abroad, particularly in Western Europe and North America in the last 50 years or so. The Institute of Food Technology of USA recently listed the top ten achievements in food technology in the last 50 years. Most of these landmarks in food are hardly known to the masses in our food scarce country. These are:

1. Aseptic Technology: This technology has been a remarkable development, as tetrapak has been popular throughout the world. Everyday 100 million aseptic packages roll off tetrapak machines around the globe.
2. Canning process with safe preservation of foods.
3. Microwave oven is making a revolution in home cooking. By the year 2000 AD, 90% of American households will be cooking with microwave ovens and the same trend may follow in Western Europe and Japan.
4. Frozen concentrated citrus juices.
5. Atmosphere-controlled packaging for fresh fruits and vegetables.
6. Freeze drying.
7. Frozen meals.
8. Irradiation of foods.
9. Food fortification practices which have improved public health.
10. Ultra-high temperature/short term sterilisation of milk and other products.

The above ten innovations have helped ensure healthier eating habits and also reduced food bills significantly in the advanced affluent countries.  
(Chemical Weekly 35(30), 1990, 105)

## 136 Curbs on vanaspati expansion eased

The Union Government is reportedly allowing capacity expansion by private sector vanaspati units more liberally. The Government has recently cleared five proposals for capacity expansion in the private sector. The five proposals are those of Oswal Vanaspati and Oil Mills, Ludhiana, Agarwal Industries, Hyderabad, Haryana Vanaspati and General Mills, Swarup Vegetable Production, Uttar Pradesh and Deepak Vegetable Oil India Pvt Ltd., Gujarat. According to the Union Ministry of Food and Civil Supplies, the proposals for expansion of existing units will be considered irrespective of which sector the units belong to. Expansion may be allowed from the minimum economic size of 25 tonne per day to 50 tonne per day depending on the location.

(Industrial Products Finder 18(6), 1990, 139)

## 137 Food processing: Assocham seeks excise relief

The Associated Chambers of Commerce and Industry (Assocham) has urged the Government to withdraw the excise hike on jams, jelly and juices proposed in the 1990-91 Budget.

In its view, the doubling of excise levy will inhibit the growth of food processing industry.

Assocham has also called for a review of the excise duty on indigenous equipment required for preserving food products and food-based beverages, with a view to making their cost economical. The present excise duty, which in some cases is as high as 63 per cent adversely affects the cost of refrigeration equipment.

In a note to the Finance Minister on the subject, Assocham said fruits and vegetables being perishable commodities, a substantial part of the production goes waste in the absence of modern processing and preserving facilities.

According to one estimate, the annual wastage in the country of fruits and vegetables is of the order of Rs. 3500 crores and the reason for this colossal wastage is the lack of processing facilities in the country.

(Financial Express 26 April 1990, 4)

## 138 Solvent extractors and excise rebate removal

The Government's decision to withdraw the excise rebate on the use of non-conventional oils in the manufacture of soap and vanaspati has shocked the solvent extraction industry.



Speaking to newsmen the President of the Solvent Extractors' Association of India, Mr.H.P. Gupta said, this would put all the developmental efforts of the Technology Mission on Oilseeds and other departments of the Union Government and Industry in the reverse gear and the country would not be in a position to realise the full potential of these non-conventional oils.

He urged the Government to reconsider its decision in the light of heavy expenses incurred by the industry in upgrading such non-conventional oils which were inherently of low grade.

Elaborating the benefits experienced out of the excise rebate last year, Mr.Gupta said, the production of solvent extracted oils rose from 1.5 lakh tonnes to about five lakh tonnes in all commodities the major being rice bran oil, solvent extracted oils from oilcakes and the minor oils of tree and forest origin.

The potential from these non-conventional resources was about one million tonnes, he said. With exports rising from Rs. 270 crore to over Rs. 550 crore, the oilseeds sector achieved a net export earner status this year as against net importer status last year.

He expected the sector to reach an export target of Rs. 800 crore by 1989-90 as his Association with various Government agencies and financial institutions including the State Bank of India recently initiated a technological upgradation programme.

State Bank of India's Director in Project-Uptech Mr.A.B.Chakravarty informed that SBI was conducting a survey of the industry in Andhra Pradesh particularly to produce rice bran oil.

On having an overall view including technological innovations that are being tried by various agencies both in India and abroad, he said a comprehensive action plan would be chalked out to commence a technological upgradation exercise in the industry.

In this context, Mr.Chakravarty informed that the SBI's lending to the solvent extraction industry was substantial with a total credit of over Rs. 120 crore.

(The Oils and Oilseeds Journal 42(1-3), 1989, 76-77)

### 139 Alcohol shortfall

An All-India survey by the Central Molasses Board has projected a shortfall of 779 lakh litres of industrial alcohol during the 1989-90 season.

It places all-India production at 9,749.89 lakh litres and all-India consumption at 10,529.18 lakh litres, leaving a deficit of 779.29 lakh litres.

Only a few States will have surpluses. Important among them are Maharashtra 238.98 lakh litres, Madhya Pradesh 233 lakh litres, Tamil Nadu 207 lakh litres and Uttar Pradesh 694.79 lakh litres.

The total availability of alcohol during the alcohol year 1988-89 was 9,422.32 lakh litres and total consumption 8,938.61 lakh litres, resulting in a surplus of 483.71 lakh litres. This surplus is after taking into account material exported out of the country by two States: 207.92 lakh litres from Maharashtra and 407.41 lakh litres from Uttar Pradesh.  
(Chemical Weekly 35(24), 1990, 57)

#### 140 Cereal consumption pattern

Per person consumption of cereals for a period of 30 days in rural areas (in kg):

State	Rice	Wheat	Jowar	Bajra	Rice + Wheat
Andhra Pradesh	11.45	0.22	1.36	0.27	11.67
Assam	13.76	0.71	-	-	14.47
Bihar	8.61	5.81	0.12	-	14.42
Gujarat	1.89	3.82	1.02	4.45	5.71
Haryana	0.84	12.44	0.15	1.05	13.28
Karnataka	4.93	0.72	4.44	0.17	5.65
Kerala	8.97	0.72	-	-	9.69
Madhya Pradesh	5.96	5.31	2.31	0.41	11.27
Maharashtra	3.21	2.19	5.99	1.17	5.40
Orissa	15.32	0.76	-	0.01	16.08
Punjab	0.97	11.06	0.03	-	12.03
Rajasthan	0.41	10.50	0.49	3.03	10.91
Tamil Nadu	9.92	0.28	0.05	0.06	10.20
Uttar Pradesh	3.83	10.41	0.14	0.31	14.24
West Bengal	13.76	1.42	0.01	-	15.18

Note: Per person consumption of jowar and bajra is insignificant in the urban areas.

(Financial Express 23 March 1990, 1)

#### 141 Food processing

India has witnessed remarkable progress in the food processing industry.

There are about 2300 units licenced under the Fruit Production Order 1955. The total installed capacity of the fruits and vegetable industry in the organised and unorganised sectors taken together is about 3.80 lakh tonnes per annum. There are about 32 units registered with DGTD with the total capacity of about 1.20 lakh tonnes.

The current production of the food processing industry is placed at around 1.40 lakh tonnes (valued at over Rs. 150 crores) as against the installed capacity of 3.79 lakh tonnes, the capacity utilisation being 37 per cent. This represents 0.4 per cent of the estimated output of the manufacturing industry and less than 0.1 per cent of the gross national product.



The installed capacity of processed food increased from 4.80 million tonnes in the First Plan to 42.80 million tonnes in the Sixth Plan, while the production rose from 4.60 million tonnes to 30.17 million tonnes during the same period.

The Food Processing Ministry now has allowed multinational companies to enter in the field of food processing with latest technology for producing quality goods and expanding exports to third countries.

**Meat:** There are 140 processing units in the private sector. The country produces 13 lakh tonnes of meat, while the demand for meat is estimated at 18 lakh to 22 lakh tonnes by the end of the century. Per capita availability of meat in India is 1.8 kg per annum, while it is 104 kg per annum in New Zealand, 94 kg. in Australia, 86 kg. in the US and 65 kg. in the U.K.

**Fish:** Production of fish rose from 7.5 lakh tonnes in 1950-51 to 35 lakh tonnes in 1987-88.

**Potato products:** Potato products have very high demand in domestic markets. Potato production has increased from 4.81 million tonnes in 1970-71 to about 14 million tonnes in 1988-89. It is likely to be 16 million tonnes at the end of Seventh Plan. Demand for mash potatoes and other products emerge from the market segments like hotels, institutions, household sectors etc. Annual domestic demand for mashed potatoes is estimated to be around 60,000 tonnes.

**Cereal products:** India produces a number of cereals and therefore the processed cereal products industries do possess an enormous potential.

**Ice cream:** Production and consumption of ice-cream in India represents only the tip of the iceberg. Production of icecream which was eight thousand tonnes in 1980 is estimated around 15 thousand tonnes in 1989.

**Processed fruits and vegetables:** Production of fruits and vegetables was around 60 million tonnes. The extent of losses estimated were around 15 million tonnes. By the end of the Seventh Plan, production of fruits and vegetables is likely to exceed 70 million tonnes. In order to minimise the losses suitable programmes must be evolved and implemented to promote production of fruit product at enlarged levels.

**Salads:** With the growth of health and fat conscious of foods, salads have large untapped demand from dieticians, tourists, hospitals, house-holds etc.

**Soups:** The short-term markets for soups include hospitals, five-star hotels etc. The development of a long-term market for soups will depend upon promotional measures like information to consumers, the national health consciousness and role of food educationist. Demand for soups in Bombay, Calcutta and Delhi is estimated around 350 tonnes per annum.

**Exports:** Exports of preserved fruits and vegetables during 1987-88 amounted to 38,120 tonnes valued at Rs. 39.13 crores as against 46,933 tonnes valued at Rs. 48.93 crores during 1986-87. The drop in exports is mainly attributable to a much lower off-take by USSR which has been a major market. Exports during the period April-December 1988 were estimated at Rs. 36.97 crores.

Exports of fresh fruits and vegetables during 1987-88 was of the order of Rs. 92.98 crores as against Rs. 103.06 crores during 1986-87. Exports during April-December 1988 were estimated at Rs. 86.28 crores. Exports of fresh fruits and vegetables are expected to touch Rs. 170 crores by the end of the Seventh Plan.

Exports of marine products continue to show an increasing trend. Exports of fish and fish preparations during 1987-88 were 97.2 thousand tonnes valued at Rs. 531.20 crores as compared with 85.8 thousand tonnes valued at Rs. 460.67 crores in the preceding year. Export of these items during April-December 1988 stood at 68.1 thousand tonnes valued at Rs. 420.92 crores. Exports of spices have increased from Rs. 282.5 crores in 1985-86 to Rs. 350 crores in 1987-88.

India has one of the largest livestock population for meat production. Exports of meat and meat products during 1987-88 is placed at Rs. 93.95 crores as against Rs. 74.88 crores during 1986-87. Exports during April-December 1988 were estimated at Rs. 77.52 crores. By the end of the Seventh Plan, exports are expected to reach Rs. 115 crores. Exports of Guar Gum, Walnuts and Mushrooms during 1987-88 are placed at Rs. 120.91 crores as against Rs. 71.71 crores during the previous year. Exports during April-December 1988 were estimated at Rs. 87.43 crores. By the end of the Seventh Plan, exports are expected to reach Rs. 140 crores.

The Union Budget for 1989-90 has added 13 items of machinery to the existing list of the food processing sector and prescribed concessional duty of 40 per cent ad valorem. It has also reduced customs duty on machinery for marine food processing sector from 61 per cent to 40 per cent. The Budget for 1989-90 has also reduced excise duty rates on skimmed milk powder and condensed milk to 10 per cent ad valorem from the rates prevailing before 1989-90, but withdrew the full exemption to skimmed milk powder in one kg pack. Excise duty on preparations of fish or meat in unit containers has been reduced, while ready to cook-mixes like idli-mix, dosa-mix, vada-mix, jalebi-mix and gulab jammun-mix have been exempted. (Financial Express 1 February 1990, 3)

#### 142 Steps to boost food processing industries

The Government has formulated a number of schemes for the 1990-91 Plan to provide support to the growth and development of food processing industries in various sectors.

Giving this information in the Lok Sabha on Wednesday, the Minister for Food Processing Industries, Mr. Sharad Yadav, said several schemes were being conducted from time to time for development of



various sectors of food processing industries including fruit and vegetables processing, meat processing, marine fisheries and packaging industries.

He said during the coming years efforts would be made to strengthen the processing industries to enable them to compete in the well developed international market.

Pointing out that large quantities of fruits and vegetables were spoilt for lack of proper storage facilities, the Minister said the emphasis initially would be on meeting the indigenous demand of the sector and strengthening the existing facilities.  
(Financial Express 12 April 1990, 4).

### Food Regulation, Quality Control & Hygiene

#### 143 Genetic engineering

The Ministry of Environment and Forests has published in the Gazette of India, Part II-Section 3 - Sub-section (1) No. 621 - The Rules for the manufacture, use, import, export and storage of hazardous micro-organisms/genetically engineered organisms or cells applicable to the manufacture, import and storage of micro-organisms and gene-technological products.  
(The Gazette of India Part II-Section 3, -sub-section(1) No.621, 5 December 1989)

#### 144 New and revised Indian Standards on Food

IS 4449: 1988	- Alcoholic drinks - Whiskies (third revision). Gr.2
IS 5960 (Part 9): 1988	- Meat and meat products - Methods of test: Part 9 Determination of total phosphorous content. Gr.3
IS 7181: 1989	- Ice cream cones (first revision). Gr.2.
IS 7592: 1989	- Peanut chikki (candy) (first revision) Gr.2.
(Standards India 3(8), (10), 1989)	

## HYGIENE

## 145 Limited use of food irradiation approved in India

India's National Monitoring Agency (NMA) set up by the government to study the problems associated with food irradiation, has recently approved limited irradiation tests with a view to generate commercial use of the process which kills bacteria that cause deterioration of food.

Food irradiation recently became controversial in India following public protests over the import by India of Irish butter oil that was alleged to have been contaminated by fall out from the Chernobyl nuclear explosion

However, last November, Mr.M.R.Srinivasan, Chairman of India's Atomic Energy Commission, reported that the NMA has approved the irradiation of spices and frozen sea food for export, as well as the irradiation of onions for the domestic market.

To further the prospects of commercialisation, the Department of Atomic Energy has joined the Gujarat Agro Industries Corp. and the Spices Board of Kerala, and intends soon to set up gamma irradiation facilities as a number of places in India.  
(Chemical Weekly 35(30), 1990, 106)

## 146 Ban on tetrapack fruit drinks demanded

With a view to protect and uphold consumer rights as in the Consumer Protection Act, 1986 (COPRA), the consumer unity and trust society (CUTS) has sought a ban on the manufacture and sale of all tetrapack fruit drinks. CUTS has filed a complaint in this connection with the Calcutta Consumers District Forum.

In its complaint, CUTS has sought a ban on the advertisements of such products, namely Treetop Frooti and Pine-ap, as they were "misleading" a spokesman of CUTS said the "so-called fruit drinks were nothing but synthetic beverages".

The complaint is against the manufacturers of tetrapack fruit drinks namely North-eastern Regional Agricultural Marketing Corporation Ltd., a government of India enterprise, Lipton India Ltd and Parle Beverages Ltd., along with their associates and retailers.

Pointing out clause 11 of the Fruit Products Order, 1955, CUTS general secretary, Mr.Pradeep S Mehta, said it was clearly mentioned that no drink could be categorised a fruit product unless it contained a minimum of 25 per cent of fruit juice content.

Though Mr.Mehta said none of the tetrapack fruit drinks contained the specified 25 per cent fruit juice content, Calcutta Consumers District Forum has ordered the testing of the products by a recognised food Laboratory.



The general secretary said manufacturers of such drinks should immediately stop publishing pictures of various fruits on the tetra-packs because it was "illegal". He said no beverage product could have a fruit picture unless it had the specified fruit juice content. The Calcutta Consumer District Court would hold the next hearing after it receives the test reports of the products.  
(The Economic Times 5 April 1990, 8)

#### 147 Coffee - If tired

Coffee can increase work efficiency by improving the brain's capacity to process information according to a study by the Swiss Federal Institute of Technology. Test results showed that coffee consumption increased regularity of output and also an improvement in people's ability to process information. Coffee can improve the capacity to rapidly process information in difficult situations or when a person is tired.  
(Deccan Herald 18 April 1990, 8)

#### 148 Statutory warning on pan masala

Pan Masala Packets will soon carry a statutory warning that chewing the product may be injurious to health, PTI reports.

A gazette notification to this effect, amending the Prevention of Food Adulteration Rules, 1955, is under publication, it was officially stated here on Wednesday.

Meanwhile, a recent report released by the National Institute of Nutrition (NIN), Hyderabad, has identified the areca nut or supari and catechu components of pan masala as the main cancer-causing agents in pan masala.  
(The Economic Times 23 March 1990, 6)

#### 149 UK likely to set glazing limit for shrimp

The UK Department of Trade and Industry, is expected to introduce legislation to stop over glazing of frozen shell fish by June 1990 as a result of continuous appeals by shrimp processors. To protect the delicate flesh from damage, frozen shrimp need to have a minimum level of water glaze (around 10%). However, some unscrupulous processors started adding higher level of water glaze (Upto 40% or more) to boost profit margins. The consensus has been that processors should be required by law to declare the net weight of glaze on every pack they sold. However, the main problem is the lack of adequate enforcing system and checking method for the amount of glaze used.  
(Seafood Export Journal 22(3), 1990, 40-41)

## Transfer of Technology & New Industries

### 150 Joint venture to process meat products

A Rs. 9-crore joint venture project to process meat products will be set up in India under a new technology transfer agreement with New Zealand, according to PTI.

The agreement was signed last week in Auckland between India's Hi-tech group of companies and Fletcher groups of New Zealand, K.T.Chacko, director of the Indian Investment Centre said here.

The project, to be located either in Kerala or Punjab, will come into operation as soon as all formalities are concluded.  
(The Economic Times 4 April 1990, 8)

### 151 FRG offers tech to food processing industry

The West German industry has offered technology to the Indian food processing industry for developing R&D with a view to promoting imports of processed foods into Germany, reports PTI.

At a meeting with the members of the PHD Chamber of Commerce and Industry (PHDCCI), a visiting German delegation stressed that collaboration at the raw material production level might also have to be resorted to so as to improve the quality of raw materials.  
(The Economic Times 25 March 1990, 9)

### 152 Italy for Tie-ups in food processing sector

Italy, in concert with the United Nations Industrial Development Organisation (UNIDO), is drawing up a scheme that will lead to tie-ups between Indian and Italian firms in the food processing sector. The proposed scheme will be funded by the World Bank. There is a bright prospect for Indo-Italian cooperation in the processed food industry, says Dr. R.Orlando, Chairman of the Italian section of the India-Italy Joint Business Council. Steps are being taken to boost Indo-Italian ventures. This includes active participation by Italy in the trade fairs, the setting up of three Italian banks and two trade offices in Bombay and Delhi. A number of items have been identified for potential exports from India and these include processed food products, artificial and synthetic fibre and readymade garments.  
(Chemical Products Finder 8(8), 1990, 126)

### 153 Suraj vanaspati's new project

Suraj Vanaspati Ltd (SVL), a joint sector company promoted by Suraj Gupta Associates and PICUP, is launching a Rs. 12.50 crore project for the production of vanaspati. The project, coming up at Sikandarabad in Bulandshar district of Uttar Pradesh, will have a capacity of 33,000 tonne per annum. The commercial production is expected to start by march 1990.



Suraj Vanaspati is using modern technology by installing critical plant and machinery supplied by Alfa Laval India and other supported machinery through Mectech Process Engineering.  
(Chemical Products Finder 8(9), 1990, 153)

154 Ambuja Flour to diversify

Ambuja Flour Mills Ltd is diversifying into the manufacture of ready-to-eat food. A fully automated, computerised high-tech plant for the production of ready-to-eat food is being set up. The plant, which will have a capacity of 8,000 tonne per annum, will launch commercial production by March this year. The company is also diversifying into the manufacture of beer. It has joined hands with the Bihar State Industrial Development Corporation to set up a Rs. 9 crore project to take up beer production.  
(Chemical Products Finder 8(9), 1990, 161)

155 Chordia food to set up unit in Iraq

Chordia Food Products Ltd (CFDL), which has a unit for manufacturing pickles and various spices at Yavat near Pune, is setting up a factory at Baghdad in Iraq for producing pickles of green mangoes and other varieties, in technical collaboration with Iraqi firm of Al-Burakh food and can factory. This project is the first of its kind to be set up in Iraq. CFDL will be supplying plant and machinery to this Rs. 10 lakh plant, which is expected to launch production in two months.

CFDL is setting up a unit at Belgaum in Karnataka at a cost of Rs. 25 lakh. The unit is expected to be commissioned by August this year.

(Industrial Products Finder 18(5), 1990, 133)

156 Reliable foods launched

A modern snacks food plant, Reliable Foods, has been set up recently at Mandideep. It has been set up with technical assistance from Western and Japanese companies. The company has launched its products in the country. It has also started exporting its products to the Middle East countries.

(Chemical Products Finder 8(8), 1990, 140)

157 Asian Can's new project

Asian Can Ltd is setting up a fully automated, highly advanced can manufacturing plant, at a cost of Rs. 412.83 lakh with the main objective of manufacturing open top sanitary (OTS) cans, used for packaging processed food, marine products etc. Asian Can is the first company in India to install the most advanced machinery with powder coating technology for producing 100 per cent pore-free sanitary cans for processed food industry. The company has entered into

a technical agreement with IPU A/S of Denmark. The plant and machinery are being imported from reputed manufacturers from the UK, Germany and Switzerland.

Asian Can has an installed capacity of 4,338 tonne per annum of OTS cans. The company has already marketed products worth over Rs. 80 lakh and entered into selling pacts with Hindustan Petroleum Corporation, Wazirsons Exports, Hindustan Vegetable Oil Corporation, Dalmia Dairy and Kejriwal Exports  
(Industrial Products Finder 18(6), 1990, 109)

#### 158 Modern food's second bread unit

The second bread unit of the public sector Modern Food Industries here was inaugurated by the Union Food Processing Minister, Mr. Sharad Yadav, on Saturday.

The new plant, imported from Australia has a capacity to produce one lakh buns or 30,000 loaves of 400 gm bread a day, according to the Chairman and Managing Director, Dr. Sanjeev K. Chaudhry.

The Madras unit has been adjudged the best among all the bakery units in the country and has bagged the Chairman's trophy from 1973 to 1988 successively.

Dr. Chaudhry disclosed that the company will soon come up with four baby food processing plants with an investment of Rs. 10 crores each. While one of them will be located in Bangalore, the site for others are yet to be finalised.  
(Financial Express 15 April 1990, 7)

### Personalia

Nil



## Nutritional Aspects of Palm Oil

Y.H. Chong

Palm olein is now being imported on a fairly large scale and is being widely consumed in India. This paper attempts to briefly summarise the available knowledge regarding its nutritive value.

The oil palm *Elaeis guineensis* had its origin in West Africa. It is now planted commercially not only in West Africa but also in Central and South America, S.E. Asia and Papua New Guinea.

Palm oil is derived from the mesocarp of the fruit of the oil palm and should not be confused with palm kernel oil which is derived from the endocarp or kernel.

Palm oil has had a long history of food usage. The writings of early European explorers to West Africa, dating some 500 years before, mentioned its food use, while archaeological evidence indicated its availability as far back as 5,000 years ago<sup>4</sup>.

Malaysia is now the major producer and exporter of palm oil. Malaysian palm oil is now exported to well over 60 countries throughout the world for both food and non-food uses.

As food, processed palm oil, particularly in the form of the liquid fraction RBD palm olein is now increasingly used as a source of cooking oil. Processed palm oil is also widely used in margarine, shortening, vanaspati and a variety of food products.

Despite its long history and wide food applications, there is still a considerable lack of understanding on the nutritional aspects of palm oil mainly because of its grouping as a saturated fat, attributing to it a harmful cholesterol-raising effect.

**Chemical composition of palm oil:** The fatty acid composition of refined palm oil and RBD palm olein is given below<sup>1,2</sup>:

Fatty Acid	Refined Palm Oil % of the total	RBD Palm Olein
12:0	0.2	0.2
14:0	1.1	1.0
16:0	44.0	39.8
18:0	4.5	4.4
18:1	39.2	42.5
18:2	10.1	11.2
18:3	0.4	0.4
Total Saturates	49.8	45.4
Total Unsaturates	49.7	54.1

Of its unsaturates, about 40 percent consists of the 18:1 monounsaturated and 10 percent of the EFA 18:2 fatty acid.

Like all other vegetable oils, palm oil also does not contain cholesterol. Refined palm oil provides a good source of vitamin E, while crude palm oil is also the richest known source of beta-carotene<sup>7</sup>.

**Effect on blood levels of cholesterol:** Contrary to expectations, recent human feeding experiments with palm oil enriched diets have shown that not only does palm oil not raise the levels of blood cholesterol and LDL, its effects are comparable to the more unsaturated oils. Indeed, palm oil appeared hypocholesterolemic when compared to other sources of saturated oils and fats.

Some of the recent findings on the effects of a palm oil enriched diet on human volunteers are as follows<sup>3</sup>.

- G. Hornstra *et al* from Maastricht demonstrated that the maximal replacement of the habitual fats in the Dutch diet with palm oil in a group of 40 male volunteers (in a double-blind crossover design consisting of two periods of six weeks' feeding) had no significant effect on blood cholesterol. The levels were 190.0 mg/dl for Dutch fat blend and 190.8 mg/dl for palm oil diet. In contrast, the palm oil diet caused a significant increase in the beneficial HDL-cholesterol and a significant reduction in the LDL-triglycerides.

- T.K.W. Ng *et al* compared the effects of diets containing palm olein, corn oil and coconut oil in three groups of student volunteers in Malaysia in the following dietary sequence:

- Group I : Coconut-palm-coconut (n = 27)
- Group II : Coconut-corn-coconut (n = 26)
- Group III : Coconut oil-coconut oil-coconut oil (n = 27)

Each dietary fat was eaten for five weeks at 37 energy percent fat of which the test fats comprised 85 percent of the total fat.

In Group I, palm olein consumption following coconut oil feeding caused a

mean serum cholesterol reduction of 36 mg/dl ( $191 \pm 50$  mg/dl during coconut oil period and  $155 \pm 34$  mg/dl during palm olein period). For Group II, corn oil feeding following coconut oil reduced serum cholesterol by a mean of 51 mg/dl ( $190 \pm 38$  mg/dl during coconut oil period and  $122 \pm 23$  mg/dl during corn oil period) whereas serum cholesterol levels for Group III subjects who were fed a coconut oil diet throughout, remained significantly higher at around 190 mg/dl. The levels of serum cholesterol at entry for all the three groups were around 170 mg/dl.

- Shafiq Ahmad Khan *et al* fed four groups of human volunteers in Pakistan diets enriched with one of the following fats: refined palm oil, butter ghee, vanaspati or hydrogenated cottonseed oil. Each diet was consumed for 60 days.

After completion of the first 60 days' feeding, the groups underwent a 10-day "washout" period, after which the groups interchanged dietary fats, each of which was consumed for another 60 days. Thus the same dietary fat was consumed over two separate 60-day feeding periods by two different groups of volunteers.

On both the 60-day feeding periods during which the palm oil diet was fed, the levels of serum cholesterol were reduced by 13 and 15 percent compared to the period of entry. A similar hypolipidemic effect was, however, not observed during the periods when butter ghee, vanaspati or hydrogenated cottonseed oil was consumed.

Several animal experiments have also demonstrated that a palm oil diet lowered blood cholesterol levels as opposed to sheep tallow, lard, the lauric oils and olive oil<sup>9,11,15,16,21</sup>.

Furthermore, K.C. Hayes recently reported that increasing the amounts of palmitic acid, the major source of saturated fatty acid of palm oil, by five-fold in the diets of three species of monkeys (cebus, squirrel and rhesus), not only did not raise blood cholesterol levels but total cholesterol actually declined by 22 mg/dl, from a mean of  $205 \pm 11$  mg/dl to  $183 \pm 9$  mg/dl<sup>3</sup>.

Hayes concluded that palmitic acid was neutral and went on to show that the Hegstead and Keys equations predicted the cholesterol response perfectly ( $r = 0.99$ ) when this new finding was taken into account<sup>3</sup>.

**Effect on blood clotting:** It is now increasingly recognised that arterial



thrombotic tendency is another important risk factor of coronary heart disease.

A palm oil diet was found to increase obstruction time of aorta loops of rats, reduce platelet aggregation, thereby reducing blood clotting tendency (anti-thrombotic)<sup>13,19</sup>.

Arterial thrombotic tendency is closely associated with the balance of two physiologically active chemical substances, thromboxane (TXA<sub>2</sub>) and prostacyclin (PGI<sub>2</sub>). TXA<sub>2</sub> is a very powerful platelet aggregating and vaso-constrictive substance that promotes clotting, while the effects of PGI<sub>2</sub> are opposite to that of TXA<sub>2</sub>. Platelet aggregation is inhibited by PGI<sub>2</sub> which also relaxes vessel tone.

The balance of TXA<sub>2</sub> and PGI<sub>2</sub> is thus very important in the maintenance of fluidity of the blood and it is known that people who suffer from coronary disease or diabetes have unfavourable TXA<sub>2</sub> to PGI<sub>2</sub> ratios that favour clotting rather than bleeding.

There are now a number of reports which show that a palm oil diet in animals either promoted the production of the anti-clotting prostacyclin or decreased the formation of the pro-thrombotic thromboxane<sup>3,5,9,13,19,21</sup>.

**Beneficial effects of palm oil vitamin E tocotrienols:** Palm oil is a very rich source of vitamin E and its content is comparable to that found in corn and soyabean oil. The predominant palm oil vitamin E are the tocotrienols which are the unsaturated analogues of tocopherol. Most commercial oils are devoid of tocotrienols, although tocotrienols are found also in rice-bran oil, wheat germ oil and the oil of barley and oats<sup>7,17,18</sup>.

Tocotrienols are now known to have a number of beneficial effects:

- suppress cholesterol production in the liver, thereby lowering blood cholesterol<sup>3,18</sup>
- reduce the tendency of blood to clot<sup>9</sup>
- give protection to certain types of experimental cancers<sup>3,14</sup>
- act as natural antioxidants, scavenging the damaging oxygen-free radicals now hypothesised to play a role in cellular aging and chronic degenerative diseases<sup>3</sup>.

**Conclusion:** While it is recognised that too much of any type of fat is undesirable particularly in the affluent communities, the current call to reduce fat

intake seemed to have focused attention only on the reduction of saturated fats.

Not all saturated fats need to raise blood cholesterol<sup>20</sup>. Cocoabutter is a good example and now the evidence we have for palm oil is that although classified as a saturated fat, it poses no added risk to coronary heart disease and instead may perhaps even be protective.

The undue emphasis given to the saturates has detracted attention from the potential hazards of polyunsaturated fatty acids and their hydrogenated products.

There is now increasing evidence that excessive intake of polyunsaturates can result in gallstone formation, suppression of HDL and the immune response, cancer development and possibly even atherosclerosis itself through free-radical mediated lipid peroxidation and damage<sup>6,10</sup>.

Polyunsaturated oils are also seldom used as such and usually need to be hydrogenated producing trans isomers. The issue of the long term safety of trans isomers is still unsettled<sup>8</sup>. Trans-fatty acids are known to inhibit the activity of enzymes involved in essential fatty acid and prostaglandin metabolism and are also known to adversely affect the reproductive performance of animals<sup>12</sup>.

In the final analysis, one must recognise that there is really no single ideal source of dietary fat. We need to obtain a balance of saturates, monounsaturates and polyunsaturates in the ratio of 1:1:1 and preferably with even a less than one ratio of polyunsaturates. Such a balance can only be obtained from a combination of dietary fat sources and by choosing our food from the widest range and varieties possible.

On the basis of present knowledge regarding EFA requirements and desirable fatty acid balance in the diet, it appears that the incorporation of palm oil in the traditional diet of S.E. Asia (consisting of rice, fish, vegetables, legumes and their products) would be safe from the point of view of nutrition and cardiovascular health.

*The author, currently Senior Consultant in Nutrition, Palm Oil Research Institute of Malaysia, was formerly Chief of Nutrition Division of Institute of Medical Research, Kuala Lumpur Malaysia.*

#### References

1. Malaysian Palm Oil, Chemical & Physical Characteristics. PORIM Technology, No. 6, 1981.
2. Oleins & Stearins from Malaysian Palm Oil, Chemical & Physical Characteristics. PORIM Technology, No. 4, 1981.
3. Proceedings 1989 PORIM International Palm Oil Development Conference (Nutrition Module), 5-9 September, Kuala Lumpur (in Press).
4. The Oil Palm. Hartley, C.W.S., Third Edition, Longman Scientific & Technical, 1988.
5. Abeywardena, M.Y. *et al.* Increase in Myocardial PGI/TXA Balance Following Long-Term Palm Oil Feeding in the Rat. *J. Molec. Cell. Cardiol.* 21, Supp. II, p599, 1989.
6. Ahrens, E.H. Jr. in 'Diet & Prevention of Coronary Heart Diseases'. Edited by B. Hallagren, Raven Press, N.Y., 1986, p81-111.
7. Barrie Tan. Palm Carotenoids, Tocopherols and Tocotrienols. *JAOCS* 66 : 770-776, 1989.
8. Booyens, J. & Louwrens, C.C. The Eskimo Diet - Prophylactic Effects Ascribed to the Balance Presence of Natural Cis Unsaturated Fatty Acids and The Absence of Unnatural, Trans and Cis Isomers of Unsaturated Fatty Acids. *Med. Hypothesis*, 21 : 387-408, 1986.
9. Charnock, J.S. *et al.* Effects of Palm Oil Enriched Diet on Cardiac Arrhythmia and Thrombogenesis in a Rat Model. Paper presented at International Conference on Oils, Fats and Waxes, Auckland, New Zealand, 12-19 February, 1989.
10. Grundy, S.M. Effects of Fatty Acids in Lipoproteins in Man, in 'Health Effects of Polyunsaturated Fatty Acids in Seafoods'. Edited by A.P. Simopoulos *et al.* Academic Press, 1986.
11. Habidah Abdul Hamid, *et al.* Effects of Dietary Fats on Serum Lipids and Lipoproteins in Rats. Proceedings of 7th Federation of Asian and Oceania Biochemists Symposium, 28-30 November, Kuala Lumpur, 1988.
12. Hanis, T. *et al.* Effects of Dietary Trans-Fatty Acids on Reproductive Performance of Wistar Rats. *Br. J. Nutr.* 61 : 519-529, 1989.
13. Hornstra, G. Dietary Lipids and Cardiovascular Disease: Effects of Palm Oil. *Oleagineux* 43 : 75-81, 1988.
14. Kato, A. *et al.* Physiological Effect of Tocotrienol. *Yukagaku (J. Jap. Oil. Chem. Soc.)* 34 : 375-376, 1985.
15. Kris-Etherton, P.M. *et al.* Effect of Dietary Fat Saturation on Plasma and Hepatic Lipoprotein in the Rat. *J. Nutr.* 114 : 1675-1682, 1984.
16. Ong, A.S.H., Qureshi, N. *et al.* Effects of Palm Oil and Other Dietary Fats on Cholesterol Regulation in Chicken. The FASEB Journal. Abstract No. 7228, Volume 2, No. 5, 1988.
17. Qureshi, A.A. *et al.* - Personal Communication.
18. Qureshi, A.A. *et al.* The Structure of an Inhibition of Cholesterol Biosynthesis Isolated from Barley. *J. Biol. Chem.* 261 : 10544-10550, 1986.
19. Rand, M.L. *et al.* Effects of Dietary Palm Oil on Arterial Thrombosis, Platelet Response and Platelet Membrane Fluidity in Rats. *Lipids*, 23 : 1019-1023, 1988.
20. Reiser, R. Saturated Fat in the Diet and Serum Cholesterol Concentration : A Critical Examination of the Literature. *Am. J. Clin. Nutr.* 26 : 524-555, 1973.
21. Sugano, M. One Counterargument to the Theory that Tropical Oils are Harmful. *Lipids (Japanese)* 40 : 48-51, 1987.



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**Raw Materials****159 Tomatoes grown on salty soil**

Scientists are finding new crops grown on salty soil and irrigated with salt water that may be useful in third countries with long ocean shorelines and scarce fresh water.

The U.S. National Research Council has just published the results of a four-year study of hundreds of plants that can tolerate salt. The report was prepared by a panel set up by the Council's board of science and technology. Seeds from a wild tomato found on the seashore of Ecuador's Galapagos islands produced small and bitter tomatoes. But when crossed with commercial tomato, tasty fruits were obtained in 70 per cent seawater.  
(The Hindu 29 May 1990, 5)

**160 Tobacco as a protein source**

Protein extracted from tobacco leaves is better for human consumption than egg white, cheese or milk, says Shuh Sheen, a professor of plant pathology at the University of Kentucky. The fibrous residue left after the extraction of the protein would also make safer cigarettes than ordinary tobacco, because burning protein generates nitrogen oxides, cyanides and carcinogens. However, "there's no such thing as a safe cigarette".

This protein has a more balanced mixture of essential amino acids than many other foods. With intensive cultivation, an acre of tobacco can yield over 200 kilograms of the tasteless, odourless protein. Processing also yields other soluble protein, fibre, and a mixture of starch and insoluble protein, plus a liquid residue that represents most of the original biomass. Nicotine ends up in the liquid, which can be used as fertiliser; the nicotine is toxic to insects.

(New Scientist 9 June 1990, 39)



## Storage and Infestation Control

### 161 Microwave technology

Microwave technology has been used to revolutionise pasteurisation and food preservation. Today microwaves have entered the American kitchen. Microwave ovens are now found in 60 million American homes. These days microwave ovens are doing more than just thawing frozen dinners and quick cooking.

The key to the heating ability of microwaves is the water molecule's dipolar structures. Alternating electro-magnetic waves keep charged water molecule spinning. The resultant friction creates heat, which is passed to neighbouring molecules.

Researchers are now learning how to use microwaves to sterilise food and give it a shelf-life measured not in days, but in years. At the Kraft General Foods Laboratory in Tarrytown, New York, physicist Charles Buffler is trying to use microwave technology to revolutionise pasteurisation. 'From the consumer's point of view' he says 'there would be no difference between microwave and standard pasteurisation. It is a simple heat time relationship. You need to heat the food at 185 F for 3 mins. It does not matter how'.

The challenge facing the food engineers is the same one that a home cook faces when trying to heat milk without burning it at the bottom of a saucepan - it must be heated evenly. To ensure that food gets evenly exposed, the conventional pasteurising chambers have complex arrays of pipes filled with hot water or steam that releases heat over, say jars of pickled beets as they move past on conveyor belts. Pasteurisation can take as long as 30 mins.

With a set-up akin to a giant microwave oven, researcher Buffler hopes not only to speed up the pasteurisation process but to take it one step further - to sterilisation. Pasteurisation does not kill all the bacteria. In contrast, sterilisation kills almost every harmful microbes the food may contain. When sealed in air-tight pouches whatever you sterilise will no longer need refrigeration.

To kill all the bacteria, the food's temperature must be raised to 250 F for 3 mins. Conventional methods, however raise the temperature so slowly that by the time the food is sterilised, it is also mushy. The procedure works for food items like stews. In fact, General Foods is now test marketing in USA its first line of sterilised stews - in a pouch. Researchers hope that with microwaves they will be able to achieve high-tech TV dinners that need no refrigeration but still keeps the veal tender, the carrots crunchy. In another 20 years or so, they predict the freezer section in supermarkets may all but disappear.  
(Chemical Weekly 35(39), 1990, 91-92)

## 162 Nitrogen freezing for better yield of crab meat

Tests carried out in the USA, it is reported, have demonstrated that freezing crab with nitrogen can produce a more moist, less salty product than the brine frozen product. The crab is also said to have a fresh flavour. The nitrogen frozen crab meat was not only found more moist, but also less fibrous in texture. The cost of nitrogen freezing in the USA is estimated to be between \$ 0.03 and \$ 0.05 per pound of crab meat. Nitrogen-frozen crab meat is already being sold by a Japanese company in the domestic market. Nitrogen freezing of crab meat has not yet become popular in Europe or the USA. The US seafood industry, it is reported, will soon adopt nitrogen freezing of crab meat.

(Seafood Export Journal 22(4), 1990, 32)

## 163 Cassava preservation technique

Cassava, which can usually be kept fresh for only two weeks after harvest, is being sold in shops in Colombia and Ecuador. The cassava has neither been frozen nor cooked but a new process has rendered it safe to be kept on the shelf ready for use. Normally, cassava becomes unacceptable for eating soon after it has been harvested, which makes it very difficult for small farmers to market.

Some years ago, the International Centre for Tropical Agriculture (CIAT) and the Overseas Development and Natural Resources Institute (ODNRI) developed a way of conserving cassava by putting it in polythene bags and treating it with a safe, thiabendazole fungicide. The roots need to be treated quickly, which means the procedure is well suited to small farmers and farmer cooperative.

Although the technique worked, it has to be taken to the market place and a marketing programme developed. Starting in one of the major cassava markets in Colombia, market preferences were ascertained. Within a short time 10 tonnes a month were being sold and sales have now spread to other areas.

In one area a farmers' cooperative negotiated an agreement with a shopkeepers' association and within two months they made a profit of US \$ 1,200. A supermarket chain has the fresh cassava delivered in 4 kg bags. So successful has the concept been in Colombia that a similar project has begun in Ecuador where fresh cassava is exported to the USA. There are plans for Paraguay to follow suit.

For details, contact: Centre for Tropical Agriculture (CIAT),  
Apdo Aerdo 67-13, Cali, Colombia.  
(Asia-Pacific Tech Monitor March-April 1990, 26-27)



## Food Additives

### 164 Super critical extraction for Indian spices

There is a tremendous market for Indian natural flavours, fragrances, natural colours and spice extracts in the Western developing countries, reports Mr. John Dean, an international expert in this field. According to Dean there is a great potential for the development of natural spices and plants in India for the export of their essences and fragrances. There is at present a great craze for natural products and India should take advantage of this craze.

From the Indian context, what seems to be most attractive is the processing of spices, oleoresins, natural colours and essential oils, since India is one of the largest spice exporters. Use of supercritical carbon dioxide to extract oleoresins/essential oils and colours from spices can become a stepping stone for India in the field of supercritical extraction technology.

Supercritical CO<sub>2</sub> can be used to extract flavour components of spices to give spice extracts with natural composition with no solvent residue. Spices like pepper, chilli, nutmeg, etc., have been tried for supercritical extraction. Advantages from this type of extraction are: (a) greater uniformity of the product, (b) gives product free from microbial contamination and (c) high yield with higher quality obtained.

Supercritical fluid extraction also is of immense value in the extraction of natural colouring substances. Paprika presents an interesting challenge in this direction. The use of paprika oleoresin as a natural colouring agent in food is greatly hampered due to the presence of 'capsaicine' which gives a hot, burning taste. Removal of capsaicine from oleoresin requires temperature, which in turn reduces its colour value. However, the two stage extraction of dried paprika powder by supercritical CO<sub>2</sub> allows selective extraction and effective separation of capsaicine from red colouring matter, giving good natural colour free from hot principles. In this manner, the method yields two high valued products: (a) hot principle to be used as flavouring extract, (b) good natural colouring matter and (c) high protein residue, a low value product, useful as an animal feed. (Chemical Weekly 35(34), 1990, 97)

### 165 New sweetener

Nutrasweet Co., a subsidiary of Monsanto and the leader in non-caloric sweeteners with their Aspartame K has taken the lead towards a new series of computer designed sweeteners. One of these based on beta amino acid (as against the normal alpha amino acids) is said to be 20,000 times sweeter than sucrose. They have evolved a rationally

planned research linked to computer models of molecular design for specific activity, on the lines of the drug industry. No more accidental products or serendipitous discoveries ?

Suosan lacked the large hydrophobic recognitor unit common to many high potency sweeteners. Based on this finding a series of better Suosan related sweeteners have been developed -- based on beta alanine.

They have taken up design of new sweeteners that would be absolutely safe in terms of longterm toxicity of the sweetener as well as its metabolism. A better understanding of biological message transduction is expected to lead to many more.  
(Chemical Weekly 35(41), 1990, 43)

## 166 Fat substitute

Monsanto Chemicals report the approval of FDA for their new fat substitute compound termed "Simplease". The fat substitute product is a proprietary blend of non-fat milk and egg whites and is not a synthetic product. "The ingredients are heated and sheared in a microencapsulation technique that results in miniscule spheres that roll over one another to produce the rich taste and texture associated with fats". The Food and Drug Administration stepped in and forced the product for approval to be certified as "Generally Recognised as Safe" ingredient.

It will be of low caloric input and avoids the cholesterol problems associated with fats. FDA is to give approval of specific products containing simplease and presently ice cream has such approval. A four ounce serving has only 1 gram of fat as against 15 grams of butter fat in regular ice cream. Consumer acceptance is now awaited for generating a big market. Future product lines with simplease are salad dressing, mayonaise, cheese etc. Similar products by others for use in cooked foods are also awaiting FDA approval.  
(Chemical Weekly 35(32), 1990, 44)

## Processes

## 167 A new method of making vanaspati

Researchers in Calcutta have reported success with a new process of making vanaspati from vegetable oils by inter-esterification, which offers several advantages over the conventional hydrogenation process.



Not only is hydrogenation an energy-intensive process, but it also leads to the formation of many trans-unsaturated acids, including the transisomeric acid of the essential fatty acid linoleic acid, which is undesirable from the health point of view.

Researchers at the department of chemical technology, university of Calcutta, studied the efficacy of a new process involving inter-esterification of glycerides, which is employed in some of the developed countries to produce margarine and shortenings from liquid oils.

Using a number of liquid oils as such or in combination, they found that the inter-esterified products were comparable to vanaspati prepared by hydrogenation, as far as the nutritional quality was concerned.

The Calcutta researchers studied two kinds of esterifications - random and directed. The ester-ester interchange is random when the natural oils become oriented in their glyceride pattern so that the composition of the glyceride becomes identical to that obtained by esterifying glycerol with fatty acids.

They report that sal oil can be inter-esterified with cottonseed oil and sunflower-oil and mowrah with rice bran oil to yield products similar to vanaspati. Also, palm oil and its fractions can be better utilized in the inter-esterification reaction than hydrogenation.

The investigators further point out that if the inter-esterification is carried out in the presence of a catalyst, then the fatty acid distribution cannot be specific, making the process unsuitable for products like cocoa butter. However, enzymatic inter-esterification is better than conventional catalytic process.

The inter-esterification process has recently been included by the Central Committee of Food Standards (PCB).  
(P.T.I. Science Service 9(8), 1990, 5)

#### 168 Mass-producing low fat butter

APV has recently acquired world-wide rights to a unique process for the manufacture of low fat butter. Introduced to the Swiss market early in 1989, this low fat butter was a great success. In comparison with other processes, this special technique uses raw butter as a base adding only those ingredients found naturally in milk. Many manufacturers add emulsifiers and preservatives to stabilise the product. In this new process only caseinates, lactic acid and water, all natural constituents of milk are used.

Low fat butter, produced by the new process, has a fat content of 40%, where as in normally produced butter, the fat content can be as high as 80% to 85%. Consequently, both the calorific value and the cholesterol level are reduced to less than half. Tasting just like ordinary butter, the new low-fat butter spreads easily straight out of the refrigerator.

APV has improved the basic process, making it continuous and therefore, more suited to industrial scale production. It is now available as a standardised unit operation with a maximum capacity of 1200 kgs per hour. Already, two plants, worth approximately 650,000 have been sold to W.Germany.  
(Chemical Weekly 35(39), 1990, 89)

#### 169 Substitute of brominated vegetable oil

Researchers in Delhi claim they have found a non-toxic substitute for brominated vegetable oil (BVO) which has become the focus of public interest in recent times because of the government's ban on the use of BVO.

Brominated vegetable oil is used as an important ingredient by soft drink manufactures to produce a clouding effect in their products.

However it became the centre of a controversy when researchers found that it could cause cancer, and the Government of India banned its use with effect from April 15 this year.

The Shriram Institute of Industrial Research (SRI), New Delhi, now reports that its scientists have successfully developed a non-toxic substitute for BVO using chemicals that have been approved by the Prevention of Food Adulteration Act (PFA).

The new formulation is based totally on indigenously available chemicals and has given "highly satisfactory" results during trials.

It imparts a good stability to the soft drinks, without having any side effects. It has also been found to be superior to other known substitutes of BVO like Ester gum.  
(P.T.I. Science Service 9(9), 1990, 4)

#### 170 New light on enzymatic production of starch from corn

The steeping step in the semiconductors process for making starch from corn varies from 36 to 60 hours, depending on the type of corn. That is substantially longer than all subsequent steps.

Adding phytic acid degrading enzymes (Econase Ep 434) together with plant cell wall degrading enzymes to the steep liquor reduced steeping time considerably. The use of enzymes also resulted in a higher yield of the starch and lower energy consumption.  
(Chemical Weekly 35(35), 1990, 93)



## Byproducts and Waste Utilization

-Nil.

## Processed Products

### 171 Capacity Utilization of some selected processed food products

Product	1984-85	1985-86	1986-87
Biscuits	89	91	93
Confectionery	66	63	72
Bread	157	98	73
Soft drinks	62	56	57
Malt extracts	51	59	62
Pearl Barley	9	12	16
Cornflakes	18	19	22
Guar gum	72	61	63
Weaning food	48	91	92
High protein food	54	52	53
Starch	55	50	53
Liquid glucose	43	47	49
Dextrose	47	71	63
Anhydrous dex	38	55	55
Enzymes	10	14	15
Drinking chocolates	23	18	24
Chocolates	64	85	89
Cocoa powder	31	35	38
Processed fruits and vegetables	37	41	38

(Productivity 30(4), 1990, 473)

## 172 Comparative yield of finished products

Product	Raw Material per tonne of Finished Product (Tonne)	
	India	Other Countries
Orange Juice Concentrate (64 Brix)	14	10 (Brazil)
Pineapple juice Concentrate (65 Brix)	16	8 (Phillipines, Hawaii)
Tomato Paste Concentrate (28 Brix)	7	4 (Italy)

(Productivity 30(4), 1990, 476)

## Equipment and Machinery

## 173 Rotary cone dryer

This is very useful for uniform and low temperature drying of heat sensitive chemicals. It has a double conical vessel with rotating system and vacuum solvent recovery system. This equipment being rotating, there is no charring or retention of product. One can change the product at will. This equipment rotates at very low speed (5 to 15 RPM) resulting in less wear and tear and requires very little maintenance. This can be used for crystalline products, granules in chemicals, and in food industries. The range is from 250 to 3,000 litres capacity. Features include: totally sealed and protected from contamination; quick loading and unloading; fast drying; and energy saving.

For more details write to: Rifriends Engineering Works, W-73 MIDC Phase 11, Manpada Road, Dombivil (East), Maharashtra 421 203. (Chemical Products Finder 8(12), 1990, 93)



#### 174 High speed hydro-jetting bottle washing machine

Master High Speed Hydro-Jetting Bottle Washing Machine is available in three sizes: 120-190 bottles/min, 150-250 bottles/min, and 240-320 bottles/min. Other capacities are built to suit the user's requirements. The machine is capable of automatic intake of bottles, inverting them, and passing them through a series of jet washes. The machine can be offered with stages for pre-wash, hydro-wash, warm-wash, pre-final wash, and for reverting the dry air washed bottles to their original upright position prior to automatic discharge onto an outlet conveyor. Suitable tanks for recycling the hydro and warm washes as well as blower for blow drying are provided.

For more details write to: The Master Mechanical Works Pvt Ltd., Pushpanjali, S.V. Road, Santa Cruz (W), Bombay-400 054.  
(Chemical Products Finder 8(11), 1990, 16)

#### 175 Pouch sealing machines

Sealers India manufactures sealing machines. Several models are available, which come in impulse as well as continuous types. Impulse sealers are used for sealing bags or pouches made of virgin films like polyethylene, PP, HMHD, and thin PVC films. Continuous type sealers are used for bags or pouches made of laminated materials like polyester poly, metallized polyester, laminated aluminium foil, and multi-layer films. The machines are available in hand operated (light and heavy duty), foot operated, and pneumatically operated models. Machines are also custom built.

For more details write to: Sealers India, No.7 & 8, Mugappair Road, Padi, Madras 600 050.  
(Chemical Products Finder 8(12), 1990, 74)

#### 176 Oil expeller

The Mechanical Engineering Research and Development Organisation (MERADO), Ludhiana, has designed and developed a double-chamber modern oil expeller (10 tonnes per day capacity) under the Technology Mission on Oilseeds.

Trials conducted on the prototype expeller with mustard seeds have given repeatable results of 5.8% residual oil in cake in one-go crushing of the oilseeds. The throughput of the machine has been recorded up to 12 TPD (500 kg/hr). In comparison, conventional single-chamber expellers require four successive crushings of the seeds even to achieve about 7.5% residual oil in the cake.

The advantages of a MERADO expeller compared to the conventional one (33" x 6" dia) are as follows: 1.5 to 2 per cent extra oil recovery, the quality of oil conforms to BIS specifications and the cake is bright green without any discolouration.

A number of trials have been conducted on the prototype expeller with a view to determining optimum process parameters for oil extraction. Optimum working parameters such as moisture and temperature of the seed at various points, time of cooking, etc., have been established to achieve the highest recovery of quality oil and acceptable cake. Design parameters have been optimised to achieve high performance.

For further details write to Mechanical Engineering Research and Development Organisation, Gill Road, Ludhiana 141 006.  
(The Oils and Oilseeds Journal 42(4-6), 1989, 70)

#### 177 Rotary screen grain cleaner

Carter-Day International, Inc, USA offers a wide range of machines for cleaning, drying, sizing, and grading of agricultural products. Carter rotary screen grain cleaner is a versatile separator suitable for virtually any screening operation - scalping, aspirating and sifting grain for market, pellets, rolled grain, raw grain for feed, wheat flour, and other needs. The varied combinations of deck sizes and screen arrangements permit a range of optimum cleaning capacities from 25 T/hr to 400 T/hr.

For further information write to: Maharashtra Hybrid Seeds Co. Ltd., Arya Plaza, 1st Floor, Opp Uma Theatre, Chamrajpet, Bangalore, Karnataka-560 018.  
(Industrial Products Finder 18(7), 1990, 215)

#### 178 Vacuum drum filter

This filter is used in chemical, food, dyes, pharmaceutical industries. The heat transfer is effective and cost of operation is less. Process is continuous. One can use this filter in many industries including food processing (dextrose, glucose, protein hydrolysates, winterised palm oil, fatty acids); and wastewater treatment (flyash, gypsum, industrial wastewater).

For more details write to: Bifriends Engineering Works, W-73, MIDC Phase II, Manpada Road, Dombivli (East), Maharashtra 421 203.  
(Chemical Products Finder 8(12), 1990, 69)

#### 179 Continuous rice puffing machine

Puffed Rice is widely consumed in our country, especially in the villages. Considered to be the poor man's diet, it is a cheap and ready-to-eat food. It is liked for its colour, flavour, crispness and taste.

Puffed rice is traditionally prepared by sand roasting of pre-conditioned rice. The process is tedious and time consuming. The maximum output attainable by this method is only about 2.5 kg/hr. Being sand roasted, the sieved puffed rice contains some traces of sand which makes it uncomfortable to eat and is injurious to health.



Inspite of its shortcomings, the traditional method has survived since ages, and no alternative/technology is yet available.

A simple rice puffing machine based on the principle of hot fluidized bed has been developed. Preconditioned rice is fed in a continuous flow to a vertical column of hot air bed. The air velocity is so maintained as to keep the rice grains under suspension. Once the rice is puffed it travels upward due to its low density and is collected through a cyclone separator. To save energy the hot air from the cyclone separator is recirculated. The operation is fully automatic.

The hot air can be obtained by means of electric heaters, gas burners or an oven fueled by agricultural waste. The electric blower can be replaced by a manually operated blower. The technology is simple, easy to operate and gives puffed rice fully free of impurities.

Comparing the energy required for puffing, the new process has been found to use 50% less energy than the traditional one.

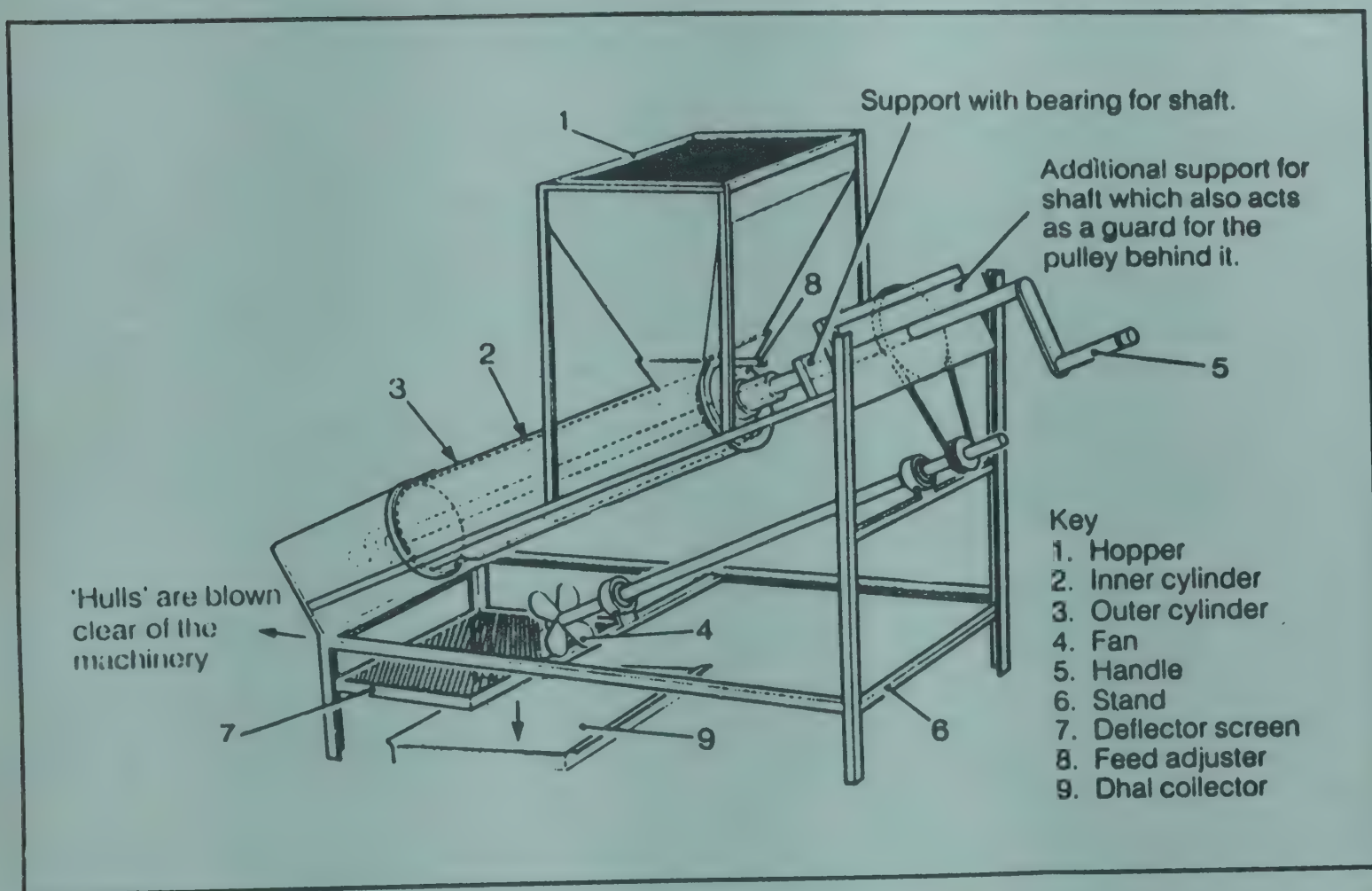
The present laboratory model has a capacity of 25 kg/hr. However, it can be scaled up for higher capacities according to the requirements of the industry.

For details, write to: Dr. P. R. Chandrasekhar, Dr. P. K. Chattopadhyay, Post Harvest Technology Centre, Indian Institute of Technology, Kharagpur - 721 302. India.

## 180 Soya Bean dehuller

Soya beans are valuable for the quantity of protein (40 per cent) and oil (20 per cent) they contain. In addition, soya beans contain protein of high quality, so they are of great importance to people who rely on plant materials for their protein. In order to popularize soya products, India's Central Institute of Agricultural Engineering have developed a simple dehuller which can be easily fabricated by village artisans.

The equipment consists of two concentric cylinders, a driving mechanism, a blower fan and a feeding hopper. The cleaned whole soya bean is fed through the hopper between the two concentric cylinders. The inner cylinder is made to rotate manually with the help of gears while the outer one remains stationary. The clearance between the cylinders is maintained at 75 per cent of the average soyabean grain size and the slope is  $19^\circ$ . There is a gradual decrease in the clearance from feed inlet to discharge outlet, i.e. from 10 mm to 7 mm. Shear and frictional forces imparted by the inner cylinder help in dehulling and splitting the soyabeans.



The mixture of hulls, 'brokens' and dhal (splits) flows out through the discharge outlet and falls onto the perforated deflector. The fan blows the hulls through the open end of the machine out onto the ground, clear of the machinery, and the 'brokens' fall through the perforated deflector. The splits free of hulls, slide over the deflector and are collected at the end.

The test conducted at the institute revealed that the overall dehulling efficiency is 95.5 per cent with 3-4 per cent 'brokens'. Dhal recovery achieved during the operation was however 84.5 per cent. It has a capacity of about 35 kg per hour. The cost of dehulling worked out to be Rs.0.13 per kg.



For details, contact: Central Institute of Agricultural Engineering (ICAR), Attn: Jaswant Singh and Lalan K. Sinha, Shri Guru Tegh Bahadur Complex, T.T. Nagar, Bhopal-462 003, India.  
(Asia Pacific Tech Monitor March-April 1990, 26)

# 181 A hand-operated rice and spelt wheat huller

There are several machine designs for hulling rice. One common design is the two rubber roller system, with each roller rotating in opposite directions and at different speeds. Hulls are slipped off the kernels when grains are passed between these two rollers. Another rice huller design is the horizontal abrasive disc system, using one rotating disc and one stationary disc.

The advantages of using rubber rollers are higher percentage of hulling, and less kernel breakage. The advantages of the abrasive disc system are ease of fabrication and repair of the abrasive surface when it wears out.

The I-Tech design, disclosed here, uses a vertical abrasive disc system (a hand-mill) to hull rice and spelt wheat. The advantage of using rubber surface is incorporated in this design by replacing the stationary disc with a gum rubber disc. The abrasive rotating disc remain unaltered. The replacement of the stationary disc with a rubber surface is not permanent, so the original purpose of the hand mill/grain grinder is retained.

The materials required are one steel washer, one sheet of gum rubber, cyanoacrylate glue and a hand-mill. The hand-mill and stone disc described here are available from R&R Mill Co of 45 West First North Street, Smithfield, UT 84335, USA (mention of company names/products is for benefit of the reader and does not imply endorsement by I-Tech).

This is how the system is to be used:

1. Remove auger and rotating disc from the hand-mill.
2. Remove stationary disc from mill by detaching three screws.
3. Determine the outside diameter of the stationary disc and obtain a suitable sized steel washer. The "Corona" and "Quaker City" handmills use a nominal 1-3/4 inch washer, which corresponds to 1-7/8 inch inside diameter and 4 inch outside diameter.
4. Drill and countersink three holes on the washer to mount it on to the grain mill.
5. Obtain a sheet of 1/8 inch thick gum rubber of sufficient size to cover the washer. Cut out a rubber disc with a hole to the shape of the washer. Rough up one side of the gum rubber and washer with a file. Remove oil and dirt from the rubber and washer surfaces with acetone, lacquer remover or paint thinner. Glue the rubber disc on to the washer with cyanoacrylate glue.

6. Bevel the inner edge of the gum rubber using a razor blade. Cut out mounting holes on the rubber disc.

7. Attach gum rubber + washer on to the grain mill. Insert auger and rotating disc on the mill.

The percentage of rice and spelt wheat hulled can be as high as 95% depending on the spacing between the stationary rubber disc and the rotating abrasive disc. Closer spacing increases hulling percentage and kernel breakage but decreases the hulling rate. Parallel discs with uniform spacing between them decrease the percentage of kernel breakage and unhulled grains. Well made hand-mills have bearings on both ends of the shaft and are able to maintain the discs parallel.

The described rice and spelt wheat huller using a hand-mill is relatively inexpensive and easy to maintain and the worn rubber discs are simple to replace. It is ideal for home, small scale farm and village usage. The device can also hull millet.

For details contact: Allen Dong, I-Tech., P.O. Box 795, Davis, California 95617, USA.  
(Invention Intelligence March 1990, 112-113)

## 182 Meat robot under test in the UK

A robot that can drive a powered knife through the rot section of a beef carcass and then follow the trajectory of the bone to separate the meat, has been successfully tested at Bristol University (UK).

The prototype has been developed as part of a research programme to produce an 'intelligent' meat industry robot guided by artificial vision and other sensors. It is the result of a collaborative project between Bristol University's research group and the Institute of Food Research in Bristol. Initially, the robot will concentrate on industrial meat cutting which is highly labour intensive and requires skilled labour.

(Chemical Weekly 35(34), 1990, 97)

## Packaging

## 183 Cooling bag

A Korean firm has developed and commercialized a bag for cooling and carrying beverages, fruits, meat and other food items. The bag is handy both indoors and outdoors.



The bag has an exterior mode of a special polyester and an inner surface consisting of a specially treated two-fold soft vinyl. The bag gives long-lasting cooling effect and is water, heat and scratch resistant.

By putting ice cubes or ice cooler inside the bag, the cooling effect is sustained for 8 to 10 hours. The drain hole inside the bag lets the melting ice out.

For details, contact: Dae Kwang Vinyl Co., 379-71, Hwa Kog-Dong, Kang Seo-Ku, Seoul, Republic of Korea.  
(Asia-Pacific Tech Monitor March-April 1990, 28)

#### 184 Smart packaging

An intriguing chain reaction is taking place in advanced countries in food packaging. What is emerging is a new generation of 'smart' packages. These packages do more than just offer protection. They interact with the product and in some cases, actually respond to changes. For example, if you buy frozen fish in Japan, you may encounter a disposable wrap from Showa Denko called New Pichitto. As the fish thaws, the film absorbs moisture, protecting the flavour and texture of the meat. The film has a thin layer of saccharides sandwiched between two layers of vinyl, which absorbs 3-4% of the water per hour.

The coming of microwave ovens has created new innovations in packaging for microwaveable foods. For example, susceptors are the smart package of choice for microwaveable foods. Susceptors are 0.9 mil. squares of PET film coated with a metallised aluminium surface. They absorb microwave energy reaching temperatures as high as 260 C. The surface becomes so hot, it actually makes the food crisp.

In Belgium, Van Leer Flexibles has developed a polypropylene film for fresh vegetables that allows the produce to respire. The catch is that the rate can be varied with an inexpensive additive between 5 and 8000 cc/min. In USA, Zapata Industries is reported to be closing in on an oxygen absorbing cap for beer. If completed, the cap would improve both the shelf-life and flavour of beers in future.

Another, more exotic application of smart packaging is 'shape memory' alloys. These are materials that change their shape when heated, then return to their original form when cooled. In future, one can imagine a spring on a package that would 'pop' open during cooking to vent steam.

More information on smart packaging can be obtained by referring to the report 'Global Opportunities in Smart Packaging Materials For Consumer Products'. For this report contact Technology Catalysts Inc., Falls Church, Virginia, USA.  
(Chemical Weekly 35(39), 1990, 89)

## 185 Comparative cost of modern packing materials

Materials	Indian Price (Rs./kg)	Duty Burden (%)	International Price (Rs./Kg)	Import Duty (%)
Paperboard	11.34	24	6	180
LDPE	24.70	244	8.9	170
Aluminium Foil	78.80	28	37	328
200 ml Asceptic Pack (Per unit)	0.65	31	0.25	170

(Productivity 30(4), 1990, 477)

## Analysis

## 186 Cation exchanger for food protein analysis

A polymeric cation exchanger, PL-SCX, has been developed for the analysis of biological macromolecules. The material is a rigid macroporous polymer which is chemically resistant, and suitable for the analysis of complex biological matrices after only the minimum amount of sample preparation. Food protein analysis is an important application area in which the requirement for high resolution/high speed and reproducible separations is paramount. The requirement to control and hence check the composition of food products is essential. The high speed analytical PL-SCX column can be used to obtain the protein profiles of aqueous extracts of meat and/or meat products. These profiles are characteristic of a particular type of meat. As the PL-SCX media can easily be regenerated with acid, alkali or organics the only sample preparation required for the aqueous extracts is filtration or centrifugation to remove suspended debris.

For more details write to Polymer Laboratories Ltd, Essex Road, Church Stretton, Shropshire, SY6 6AX, U.K.  
(Chemical Products Finder 8(12), 1990, 103)

## 187 Meter tests sweetness of melons

A device that measures the sugar content of melons non-destructively has been invented by scientists at the USDA Richard B. Russell Research Centre, Athens, GA, USA. The test determines the amount of soluble solids or sugars (sucrose, glucose and fructose) in a melon.



The meter emits a near infrared signal into one end of the melon and then measures the amount of light that penetrates the sides. A quartz halide projection bulb is used to get light in the 800-1,000 nm wave length region. The bulb shines a beam through three interference filters mounted on a paddlewheel. Each filter is tilted to change the angle of incidence of the beam and, thus, the wavelength. About 1 mw of energy is emitted at 900 nm.

Off-the-shelf silicon detectors connected to a computer sense any light that is not absorbed by the melon. The correlation coefficient obtained in experiments between the theoretical sugar content of honeydew melons and spectral data is 0.87.

The melon meter can be applied to any product in which sugar is a constituent of at least 5%.

The scientists are engaged in further increasing the efficiency of the meter and hope to have a melon meter on the market for growers and fruit packers in a couple of years.  
(Invention Intelligence May 1990, 205)

## Commercial Intelligence

### Production (Raw Materials)

#### 188 India ranks third in coconut production

India holds the third position in the world both in production and areawise cultivation of coconuts, according to the Assistant Director-General of the Indian Council of Agricultural Research (ICAR), Dr. Rethinam.

Presiding over a seminar on coconut development at Tenkasi in Nellai-Kattabomman district, he said the area under coconut cultivation had increased to 1.4 million hectares in 1988 against 600,000 hectares in 1949 and the annual production to 77 billion nuts from 35 billion, during the same period.  
(Deccan Herald 8 July 1990, 14)

## 189 All-India final estimates of food grains, 1987-88

(Production in '000 tonnes)

State	Rice	Jowar	Bajra	Maize	Ragi	Small Millets	Wheat	Barley
Andhra Pradesh	7,069.4	1,032.2	170.2	484.6	150.6	135.3	4.2	-
Assam	2,715.8	-	-	11.3	-	5.3	105.8	-
Bihar	4,610.5	2.7	5.0	708.8	52.2	42.9	2,776.6	54.5
Gujarat	279.3	125.2	346.1	92.6	13.9	10.4	351.2	6.8
Haryana	1,073.0	15.0	109.0	33.0	-	-	4,861.0	99.0
Himachal Pradesh	76.1	-	-	405.7	1.6	3.6	351.2	28.7
Jammu and Kashmir	420.8	0.1	3.7	298.0	-	9.3	212.0	4.3
Karnataka	1,908.8	1,477.0	285.3	516.8	1,233.2	104.6	133.9	-
Kerala	1,038.9	0.7	-	-	0.7	1.4	-	-
Madhya Pradesh	4,100.4	1,766.7	108.8	863.1	4.4	347.3	4,328.8	130.2
Maharashtra	1,712.8	5,951.9	909.6	120.0	209.2	105.0	633.4	8.5
Manipur	312.8	-	-	10.3	-	-	-	-
Meghalaya	98.7	-	-	20.1	-	3.1	6.7	-
Nagaland	86.0	-	-	9.5	-	-	-	-
Orissa	3,481.4	25.7	6.0	168.9	189.0	55.5	80.9	-
Punjab	5,431.0	0.3	14.0	366.0	-	-	11,066.0	89.0
Rajasthan	79.0	242.7	462.0	298.7	-	1.4	2,909.8	367.9
Sikkim	19.0	-	-	50.4	5.0	-	17.7	1.1
Tamil Nadu	5,604.5	768.8	302.1	31.5	329.1	188.8	0.1	-
Tripura	433.2	-	-	-	-	-	5.1	-
Uttar Pradesh	6,221.1	432.6	557.3	999.2	119.1	128.2	16,462.9	787.3
West Bengal	9,271.7	0.3	0.1	101.6	10.9	6.1	673.9	13.7
Andaman & Nicobar Islands	27.5	-	-	-	-	-	-	-
Arunachal Pradesh	125.1	-	-	35.0	-	20.0	6.9	-
Dadra & Nagar Haveli	18.9	0.6	-	-	3.8	0.5	0.2	-
Delhi	5.2	4.5	1.0	-	-	-	107.2	1.4
Goa	111.1	-	-	-	0.9	-	-	-
Mizoram	49.2	-	-	3.9	-	-	-	-
Pondicherry	51.5	-	1.0	-	1.3	-	-	-
Daman & Diu	1.6	-	0.6	-	-	-	-	-
All-India	56,434.3	11,847.0	3,281.8	5,629.0	2,324.9	1,168.7	45,095.5	1,592.8

(Agricultural Situation in India January 1989, 910-918)



All India final estimate of pulses, 1987-88

State	(Production in '000 tonnes)										
	1	2	3	4	5	6	7	8	9	10	11
Andhra Pradesh		18.5	44.8	297.1	227.3	51.2	-	-	-	-	5.1
Assam		1.6	6.2	-	-	-	-	-	-	-	53.1
Bihar		139.6	85.9	42.9	105.5	30.0	117.6	22.6	265.4	-	11.8
Gujarat		10.9	111.0	13.4	2.9	-	-	-	-	0.7	3.8
Haryana		66.0	32.2	1.2	1.3	-	7.0	4.1	-	-	0.1
Himachal Pradesh		1.0	-	1.6	-	0.5	-	-	-	-	1.5
Jammu & Kashmir		0.5	-	3.7	2.2	0.3	0.2	3.5	-	6.8	1.0
Karnataka		102.7	211.4	31.4	88.1	214.9	-	-	-	-	45.0
Kerala		-	0.2	1.5	1.0	11.7	-	4.2	-	-	0.8
Madhya Pradesh		1,470.7	387.0	147.1	51.8	39.0	146.4	44.8	198.1	-	3.3
Maharashtra		228.5	534.6	209.9	292.4	70.4	3.7	3.4	18.5	32.2	20.4
Meghalaya		0.4	0.8	-	-	-	-	-	-	-	1.5
Nagaland		-	-	-	-	-	-	-	-	-	3.7
Orissa		26.0	85.0	296.0	349.9	198.8	-	-	-	-	83.8
Punjab		29.2	24.9	3.9	27.0	-	6.4	7.3	-	0.4	-
Rajasthan		411.2	1.5	17.5	12.6	-	7.7	9.0	-	6.8	5.6
Sikkim		-	-	6.2	0.5	-	-	-	-	-	10.0
Tamil Nadu		5.0	98.0	120.1	39.9	71.6	-	-	-	-	28.4
Tripura		0.4	0.3	0.8	0.6	-	0.3	0.4	-	-	1.0
Uttar Pradesh		1,068.9	603.9	61.9	48.1	-	300.2	304.3	-	0.3	-
West Bengal		40.5	5.0	55.5	14.3	4.6	63.9	6.0	35.9	-	0.9
Andaman & Nicobar		-	-	-	-	-	-	-	-	-	0.3
Island		-	-	-	-	-	-	-	-	-	-
Dadra & Nagar		0.1	1.1	1.4	-	-	-	-	-	-	0.3
Haveli		-	-	-	-	-	-	-	-	-	-
Delhi		0.1	0.3	-	-	-	-	-	-	-	0.5
Mizoram		-	-	-	-	-	-	-	-	-	1.0
Pondicherry		-	-	1.2	0.7	-	-	-	-	-	-
All India		3,621.8	3,234.1	1,314.3	1,266.1	693.0	653.4	409.6	517.9	47.2	282.9

(Agricultural Situation in India January 1989, 919-926)

191 All-India final estimate of oilseeds production, 1987-88

(Production in '000 tonnes)							
State	Groundnut	Sesamum	Rapeseed & Mustard	Nigerseed	Safflower	Sunflower	Soyabean
1	2	3	4	5	6	7	8
Andhra Pradesh	1,708.2	21.3	0.6	5.1	7.5	51.8	-
Assam	-	7.7	167.5	-	-	-	-
Bihar	5.1	5.8	61.0	10.9	0.2	0.1	-
Gujarat	140.0	3.9	184.4	-	-	-	3.1
Haryana	3.2	0.8	329.0	-	-	-	-
Himachal Pradesh	-	1.1	1.1	-	-	-	0.1
Jammu & Kashmir	1.4	3.4	34.1	-	-	-	-
Karnataka	924.5	69.9	0.5	12.2	113.8	409.3	5.0
Kerala	4.7	3.2	-	-	-	-	-
Madhya Pradesh	229.8	41.9	253.7	44.1	0.4	-	741.5
Maharashtra	617.8	64.7	1.0	26.2	327.8	129.0	24.6
Manipur	-	0.2(E)	2.7(E)	-	-	-	-
Meghalaya	-	0.7	3.9	-	-	-	0.9
Nagaland	0.7	0.7	4.6	-	-	-	0.4
Orissa	542.5	129.8	64.8	74.4	1.6	0.2	-
Punjab	22.0	4.1	209.0(T)	-	-	-	61.3
Rajasthan	112.5	5.8	1,031.7	-	-	1.5	5.9
Sikkim	-	-	6.2	-	-	14.8	-
Tamil Nadu	1,259.9	41.9	0.2	-	-	-	-
Tripura	1.4	1.2	3.4	-	-	1.9	135.5
Uttar Pradesh	71.0	12.7	662.6	-	-	1.1	0.4
West Bengal	24.4	139.1	334.0	2.0	-	-	1.3
Arunachal Pradesh	-	0.4	13.8	-	-	-	-
Delhi	-	-	0.4	-	-	-	-
Mizoram	-	1.5	-	-	-	-	-
Pondicherry	5.1	0.2	-	-	-	-	-
Dadra & Nagar Haveli	-	-	-	0.1	-	-	-
All-India	5,673.3	562.0	3,370.2	175.0	451.3	609.7	980.0

(E) Estimated

(T) Tentative Estimate

(Agricultural Situation in India February 1989, 1002-1009)



## 192 All-India final estimate of spices, 1988-89

State	Production in '000 tonnes				
	Chillies	Ginger	Pepper	Turmeric	Coriander
Andhra Pradesh	272.4	14.14	-	156.6	18.4
Arunachal Pradesh	1.0	3.82	-	0.7	-
Assam	7.7	-	-	5.4	-
Bihar	3.7	0.76	-	4.3	4.2
Gujarat	15.5	0.34(E)	-	-	-
Haryana	5.7	0.06	-	-	0.8
Himachal Pradesh	0.1	0.53	-	-	-
Jammu & Kashmir	0.5	-	-	-	-
Karnataka	37.6	2.98	0.68	20.1	-
Kerala	0.9	45.85	42.51	6.2	2.5
Madhya Pradesh	9.9	3.58	-	0.8	-
Maharashtra	64.2	0.97	-	7.0	22.8
Manipur	3.0	0.60	-	-	-
Meghalaya	1.1	29.00	-	1.8	-
Mizoram	2.0	8.44	-	-	-
Nagaland	0.3	0.92	-	-	-
Orissa	58.1	13.46	-	33.1	-
Punjab	5.1	-	-	-	4.9
Rajasthan	37.9	0.10	-	0.4	-
Sikkim	-	14.00	-	-	101.8
Tamil Nadu	32.6	0.64	0.22	87.9	-
Tripura	0.6	1.19	-	2.0	14.4
Uttar Pradesh	16.4	3.54	-	0.8	-
West Bengal	32.7	8.65	-	13.2	3.4
Pondicherry	-	-	0.01	-	-
All-India	609.0	153.57	43.42	339.8	173.2

(E) Estimated

(Agricultural Situation in India February 1990, 987-990)

## 193 All India final estimate of potato and onion, 1988-89

(Production in '000 tonnes)

State	Potato	Onion
Andhra Pradesh	3.6	125.6
Arunachal Pradesh	20.9	-
Assam	345.9	11.2
Bihar	1,472.0	120.0
Gujarat	314.5	527.9
Haryana	142.0	39.5
Himachal Pradesh	110.0	1.6
Jammu and Kashmir	2.8	Neg.
Karnataka	217.3	274.6
Kerala	-	Neg.
Madhya Pradesh	352.5	209.0
Maharashtra	50.9	780.9
Manipur	11.4	-
Meghalaya	71.1	-
Mizoram	2.2	-
Nagaland	5.0	0.7
Orissa	78.7	309.5
Punjab	513.8	25.3
Rajasthan	28.2	83.7
Sikkim	31.6	-
Tamil Nadu	104.6	220.3
Tripura	54.4	0.2
Uttar Pradesh	6,612.8	505.0
West Bengal	4,345.9	-
Delhi	0.4	1.3
Pondicherry	-	0.1
All-India	14,892.5	3,236.4

(Agricultural Situation in India January 1990, 880-881)

## 194 Area, production and export of pepper in India

Year	Area ( '000 Ha)	Production ( '000 MT)	Export Quantity ( '000 MT)	Export Value (Rs. lakhs)	U. Value. (Rs./kg.)
1986-87	132.81	31.34	37.08	20033.00	54.02
1987-88	158.49	49.23	41.01	24057.78	58.66
1988-89	NA	NA	41.06	18777.96	45.73

N.A. - Not available

(The Economic Times 15 June 1990, I)



## 195 World production of pepper and India's share

Year	World production ( '000 MT)	Share of India ( '000 MT)	Percentage share
1987	134.9	45.0	33.4
1988	174.0	60.0	34.5
1989*	163.0	40.0	25.5

\*estimates

(The Economic Times 15 June 1990, II)

## 196 Area, production and export of coriander in India

Year	Area 000 Ha	Production ( '000 MT)	Export		
			Quantity ( '000 MT)	Value (Rs. lakhs)	U. Value (Rs./Kgs.)
1986-87	395.20	182.50	1.18	140.13	11.91
1987-88	485.00	243.00	0.89	139.47	15.64
1988-89	NA	NA	8.52	566.83	6.65

(The Economic Times 15 June 1990, II)

## 197 Area, production and export of garlic in India

Year	Area	Production	Export		
			Quantity ( '000 MT)	Value (Rs. lakhs)	U. Value (Rs./Kgs.)
1986-87	59.60	208.20	0.57	51.57	8.98
1987-88	79.40	286.70	0.24	19.44	8.05
1988-89	NA	NA	4.17	240.06	5.76

(The Economic Times 15 June 1990, II)

## 198 Area, production and export of ginger (dry) in India

Year	Area '000 Ha	Production ( '000 MT)	Export		
			Quantity ( '000 MT)	Value (Rs. lakhs)	U. Value (Rs./Kg.)
1986-87	52.65	136.01	4.84	571.16	11.79
1987-88	53.69	135.46	2.63	488.99	18.60
1988-89	NA	NA	5.20	921.81	17.73

(The Economic Times 15 June 1990, II)

## 199 World production of cardamom (small)

(Tonnes)

Year	World produc- tion	Indian produc- tion	Gautemala produc- tion	Other produ- cers	Indian produc- tion as % of world production
1986-87	12800	3800	8000	1000	29.7
1987-88	13700	3200	9500	1000	23.4
1988-89	13000	4250	8000	750	32.7

(The Economic Times 15 June 1990, III)

## 200 Area, production and export of cardamom (small) in India

Year	Area '000 Ha	Production ( '000 MT)	Export		
			Quantity ( '000 MT)	Value (Rs.lakhs)	U. Value (Rs./Kg.)
1986-87	100.00	3.80	1.45	1849.52	128.00
1987-88	105.00	3.20	0.27	340.00	126.00
1988-89	105.00	4.25	0.79	1028.45	130.73

(The Economic Times 15 June 1990, I)

## 201 Area, production and export of turmeric in India

	Area '000 Ha	Production ( '000 MT)	Export		
			Quantity ( '000 MT)	Value (Rs.lakhs)	U. Value (Rs./Kg.)
1986-87	109.90	319.90	19.53	1918.30	9.82
1987-88	107.70	294.90	8.75	922.72	10.55
1988-89	NA	NA	16.52	1736.55	10.51

(The Economic Times 15 June 1990, II)



## 202 Area, production and export of chillies in India

Year	Area '000 Ha	Production ( '000 MT)	Export		
			Quantity ( '000 MT)	Value (Rs.lakhs)	U.Value (Rs./Kg.)
1986-87	834.60	629.20	4.32	495.80	11.45
1987-88	738.00	574.60	6.12	833.45	13.61
1988-89	NA	NA	5.42	1205.54	22.23

(The Economic Times 15 June 1990, II)

## 203 Revised coffee estimate, 1989-1990

(in metric tonnes)

State	Arabica	Robusta	Total
Karnataka	55,000	41,500	96,500
Kerala	1,500	28,300	29,800
Tamilnadu	14,500	4,200	18,700
TOTAL	71,000	74,000	145,000

(Indian Coffee 54(4), 1990, 26)

## 204 Coffee output to rise by 73 p.c. in 1990-91

Coffee production in the country during the current financial year 1990-91 is expected to reach a target of Rs.2,25,000 tonnes, a 73 per cent increase over the figures of 1989-90. During the last financial year, 1989-90, coffee production totalled 130,000 tonnes which was 39 per cent less than the previous year's production.

India exported 1,22,496 tonnes of coffee valued at Rs.3661.1 million during 1989-90 (April to February) compared to 98,256 tonnes valued at Rs.3377.2 million in the previous year.

The US was the largest buyer of Indian coffee, importing 6061 tonnes valued at 933.3 million during 1989. It was followed by West Germany, Italy, Japan and Yugoslavia.

Kuwait headed the list of coffee exporters in the free currency areas, buying 1574 tonnes valued at Rs.59.2 million during April-October 1989. The Soviet Union topped among the Rupee payment countries importing 27950 tonnes of coffee worth Rs.992.1 million during 1989-90. Other important importers were Czechoslovakia, East Germany and Romania.

India, which is self-sufficient in coffee, accounts for 2.4 per cent of the world's total production and about two per cent of the global exports.

Domestic coffee consumption during 1990 will be around 65000 tonnes which is 2.6 per cent more than the previous year's figure of 63328 tonnes. In 1988 the consumption was 55560 tonnes.

Under the Coffee Act, all coffee produced is compulsorily pooled with the Coffee Board for sale. Coffee is sold in the domestic market mainly through auction and its reserve prices based on the minimum release prices. Coffee meant for exports is sold in separate export auctions.

This unique mechanism of coffee pooling and separate auction systems for domestic and export sales has helped in providing fair returns to growers and also restraining fluctuations in coffee prices.

(Economic and Commercial News 20(18), 1990, 12-13)

## 205 Cashew output

Karnataka produced 22,940 tonnes of cashewnut during 1987-88 and 23,680 tonnes in 1988-89. The State exported 34,023 tonnes in 1988-89 and 45,133 tonnes during 1989-90.  
(Deccan Herald 11 May 1990, 5)

## 206 Tea production

Tea production in the country this year is expected to reach the 740-million kg mark against 700 million kg last year.

Official sources said on Wednesday that production was initially lower compared with last year with more than average rainfall. The weather has improved now.

Guwahati which had earned the reputation of being the world's biggest CTC auction centre last year sold 150 million kg. The target this year was 180 million kg sources added.  
(Financial Express 6 July 1990, 10)



Production (Industrial)

207 Process food industry demand by 1995

(lakh tonnes)		
Sector	Present production	Projected demand
ORGANISED SECTOR		
Bakery products*	12.590	34.00
Confectionery	0.260	0.37
Fruit and vegetable products	2.170	3.40
Chocolate	0.008	0.29
Dairy products processed :		
-- Baby food	0.490	0.95
-- Condensed milk	0.007	0.20
-- Milk powders	0.500	1.27
-- Ghee	0.200	0.63
-- Ice cream (lakh litres)	0.009	0.57
-- Malted milk food	0.280	0.46
Weaning food	0.009	0.25
High protein foods	0.009	0.17
Soft drinks (million bottles)	1.860	3.239
Beer (lakh KL)	1.990	4.27
Starch and derivatives	1.420	3.16
Instant coffee	0.006	0.20
Meat products	0.180	1.51
Vanaspati	8.700	17.22
Marine products	1.000	1.56

\* Also includes production in unorganised sector  
(Indian Miller 20(3), 1989, 19)

## Export

## 208 Trend in export of spices from India during 1984-85 to 1988-89

(Qty. in tonnes; value in Rs.lakhs)

Items	1987-88		1988-89	
	Qty.	Value	Qty.	Value
Pepper	41011	24058	41065	18778
Cardamom (small)	270	340	787	1028
Cardamom (large)	155	70	481	186
Chillies	6122	833	5424	1206
Ginger	2628	489	5198	922
Turmeric	8747	923	16518	1737
Curry powder	2559	438	2735	504
Seed spices	7709	1056	17535	1837
Other spices	650	104	4257	251
Spice oils	46	272	39	268
Spice oleoresins	382	1225	448	1562
Total	70279	29808	94437	28279

(The Economic Times 15 June 1990, I)

## 209 Countrywise export of black pepper

(Qty. in tonnes; value in Rs.crores)

Country	1987-88		1988-89	
	Qty.	Value	Qty.	Value
USSR	17570	106.9	12539	60.9
USA	7228	42.5	4777	21.9
Yugoslavia	1917	12.2	1803	8.4
FRG	1750	9.6	1468	6.5
Italy	1018	6.3	1771	8.3
Czechoslovakia	405	2.6	1077	4.9
France	1789	9.6	1487	6.7
Others	7491	46.3	14246	65.5
Total	39583	236.0	89168	183.1

(The Economic Times 15 June 1990, II)



## 210 Categorywise export of pepper

Item	1987-88		1988-89	
	Quantity		Quantity	
	( '000 tonnes)	Value (Rs.crores)	( '000 tonnes)	Value (Rs.crores)
Pepper whole	39.6	236.0	39.2	183.1
Dehydrated green pepper	0.1	1.7	0.1	1.2
Pepper powder	0.1	0.5	0.06	0.2
Long pepper	0.04	0.1	—	—
White pepper	0.002	0.02	0.007	0.06
Pepper oil	0.01	0.7	0.02	1.2
Pepper oleoresin	0.2	8.9	0.2	8.2

(The Economic Times 15 June 1990, II)

## 211 Countrywise export of turmeric from India

(Qty: MT; Value Rs. lakhs)

Country	1987-88		1988-89	
	Qty.	Value	Qty.	Value
Japan	1497	153	1637	151
USA	1265	184	1663	234
UK	857	92	1047	120
Singapore	436	44	512	58
Saudi Arabia	399	37	334	34
Netherlands	243	28	147	17
Kuwait	243	25	196	17
Iran	262	18	1045	106
Sri Lanka	296	17	191	15
Canada	136	20	111	15
UAR	101	9	298	29
UAE	1217	102	6746	655
Others	1795	194	2591	285
Total	8747	923	16518	1737

(The Economic Times 15 June 1990, III)

## 212 Country-wise export of dry ginger from India

(Tonnes)

Country	1987-88	1988-89
Saudi Arabia	1314	2055
USA	197	405
YAR	374	646
Morocco	—	310
U. K.	98	141
U. A. E.	35	158
Netherlands	82	146
Others	528	1307
Total	2628	5198

(The Economic Times 15 June 1990, III)

## 213 Export of chillies from India

Year	Quantity ( '000 tonnes)	Value (Rs.lakhs)	Unit Value (Rs./Kg)
1986-87	4.3	495.8	11.5
1987-88	6.1	833.5	13.6
1988-89	5.4	1205.5	22.2

(The Economic Times 15 June 1990, III)

## 214 Onion export

The Government has permitted export of consignments of onions upto 20 kg under Open General Licence (OGL-3) by air as a part of assorted vegetables irrespective of the size.

(The Economic Times 12 June 1990, I)

## 215 Minimum export price for pepper

International Pepper Community at its recent meeting held at Yogyakarta in Indonesia, endorsed the decision of the pepper exporters, not to sell Black Pepper below U.S. \$ 1.00/lb. Thus the meeting decided to maintain the 'status quo'.

The meeting also decided to exchange planting materials between the member countries for the purpose of experimentation. It has also been decided to arrange the visit of extension workers and progressive pepper farmers from Indian and Indonesia to Malaysia during the third quarter of 1990 under an exchange programme. The IPC budget of U.S. \$ 189,176.00 for 1990 was approved. India being the largest



producer and exporter of pepper will have the biggest share of U.S. \$ 55,883.

(Indian Cocoa, Arecanut & Spices Journal 13(2), 1989, 76)

## 216 India tops cashew exporter

India has re-emerged as the world's largest supplier of cashew kernels, exporting 43,880 tonnes of the nuts, thereby meeting nearly 50 per cent of the world demand of around 90,000 tonnes in 1989, reports PTI.

World consumption of cashew registered a seven per cent increase over the 1988 figures -- the result of low prices coupled with better supply position. India's cashew kernel exports registered a 37 per cent growth in 1989 over the 1988 level of 32,400 tonnes.

India had conceded the top position in the cashew export field to Brazil in 1988.

As in 1988, the Netherlands was the largest buyer of Indian cashew in 1989 - it bought 14,258 tonnes as against 18,481 tonnes in 1988. The US bought 5,400 tonnes.  
(The Economic Times 31 May 1990, 12)

## 217 Record exports of sesame seed

Sesame seed exports are set to record a new high this season, thanks to a favourable international situation. In the first seven months of the current financial year 1989-90, shipments amounted to 24,000 tonnes. The value of foreign exchange earned is about Rs.30 crores.

The corresponding period in the previous year 1988-89 did not witness any shipment. During the last financial year, total exports of sesame seed in Bombay was 18,000 tonnes valued at Rs.20 crores. In fact, shipments, actually took place during the five months between November 88 and March 1989.

However, in the current year the export of this premium oilseed has been taking place regularly every month. The pace with which export deals are struck and shipments effected indicates that the aggregate export during 1989-90 may well exceed 60,000 tonnes and earn foreign exchange worth over Rs.70 crores.

Major importers and users of sesame seed are Japan in the Far East, the Persian Gulf countries (Saudi Arabia, Jordan, Turkey, South Yemen), the United States, Western Europe including the U.K., West Germany, Italy and Greece and the USSR.

Indian exports are well diversified to cover almost all the major destinations. Japan happens to be the largest buyer of Indian sesame and trading houses there have evinced interest to continue import from India regularly. Large quantities have also been sold to other destinations, including the US and West Europe.

In India, the principal states producing export quality sesame seed (clear colour, high oil content and low acid value) are Gujarat and Maharashtra, Rajasthan and Madhya Pradesh have also since recently started contributing to the export pool.  
(The Oils and Oilseeds Journal 42(4-6), 1989, 27)

## 218 Niger seeds export under OGL planned

The government has decided to permit the export of niger seeds under Open General Licence (OGL-4) through the National Agricultural Co-operative Marketing Federation (NAFFED) and the Tribal Cooperative Marketing and Development Federation (TRIFED) both located in New Delhi.

The exporters are required to submit their applications to any of the two canalising agencies. Moreover, they will have to furnish declarations stating that they have not submitted their export applications to another canalising agency. None of the canalising agencies will consider the applications, if the exporters do not attach the required declarations, according to a public notice issued by the Chief Controller of Imports and Exports on December.

In terms of this notification, the canalising agencies will have to furnish monthly statements giving the details of exports allowed, names of exporters, fob value and the destinations to the Commerce Ministry for monitoring.

"This will further be subject to the condition that on the materials originally used in the manufacture of resultant product, against which replenished exempt materials is sought to be disposed of as the case may be, has not availed of the relief under the MODVAT scheme, or under rule 191-B of the Central Excise Rules; and will not claim the same subsequently. A certificate to this effect shall be produced by the licensee from the concerned central excise authorities".

The notification made it clear that for the purpose of eligibility for duty drawback, however, the quantity and value of duty paid materials as declared by the applicant to have been used in the manufacture of the resultant product, will be restricted to the quantity and value as indicated by him, in his application for the license, and endorsed as such on the Duty Exemption Entitlement Certificate (DEEC).

(The Oils and Oilseeds Journal 42(4-6), 1989, 26-27)

## 219 Food exports rise

A substantial increase in the export of marine, fruit and vegetable products as also items in the consumer industry and milk products was the highlight of 1989-90, reports PTI.



The 1989-90 annual report of the food processing industry ministry also focuses on the progress made in the fruit and vegetable sector.

The total installed capacity of fruit and vegetable processing industries increased from 5.99 lakh tonnes in December 1988 to about 7.08 lakh tonnes at the end of December 1989, the total number of licensed units increased from 3,367 as on December 31, 1988 to 3,629 on December 31, 1989.

Exports of fruit and vegetable products have increased from 49,389 tonnes valued at Rs.49.89 crores during January to December 1988 to 63,967 tonnes valued at Rs. 79.48 crores during January to December 1989.

Exports of marine products by December 1989 were 67,513 tonnes valued at Rs.426.78 crores despite a slump in major international markets.

The report points out that the production of malted milk powder including infant milk food has increased from 1,40,000 tonnes in the year 1988 to 1,65,000 tonnes during the year under report.

Similarly, production of malted milk increased from about 32,000 tonnes and 6,100 tonnes to 35,000 tonnes and 7,900 tonnes respectively.

According to the report the production of various items in the consumer industry sector has increased substantially during the year. The production of ready-to-eat extruded foods has increased from 12,612 tonnes in the year 1987-88 to 14,700 tonnes in the year under report and that of cocoa products increased from a mere 8,720 tonnes in 1987-88 to over 40,000 tonnes during the current year.

Production of high protein food increased from 7,750 tonnes in 1987-88 to 8,900 tonnes in 1989-90 and that of soft drinks increased from 1,876 million bottles in 1987-88 to about 2,070 million bottles in 1989-90.

Referring to the progress in the poultry sector, the report reveals that the modern poultry processing facilities which were not sufficient to process the large-scale production of broilers are being augmented particularly in the private sector.

Some poultry products are coming up to set up modern poultry processing plants. The report indicates that the poultry industry has made impressive progress and has grown into an organised, high productive agro-based industry contributing an estimated Rs.1,300 crores per annum to GNP and employing capital of around Rs.1,000 crores. The industry is producing over 20,000 million eggs and 120 million broilers per annum.

Under the scheme of modernisation of rice mills, the number of modernised rice mills has gone up from about 24,500 during 1988-89 to 26,750 in 1989-90.

Steps are being taken to prepare feasibility reports in sectors such as meat and meat products, fisheries, fruit and vegetable in pursuance of the proposal of the World Bank to fund certain agro-industries projects.

(The Economic Times 15 May 1990, 3)

## 220 Processed food exports

Foreign exchange worth Rs.7798.5 million was earned through the exports of products of the processed food industries during 1988-89. Of this earning, processed food accounted for Rs.1820 million while the rest (Rs.7798.5 million) by way of export of sea food.

The total exports in the year 1987-88 was worth Rs.6762.2 million consisting of processed foods worth Rs.1450.4 million and sea food worth Rs.5312 million. The foreign exchange earnings during 1987-88 from the processed food industries amounted to Rs.5968.4 million.

Disclosing this in the Lok Sabha recently, the Minister of Food Processing Industries, Mr.Sharad Yadav, said that the Government was encouraging exports from the processed food sector through measures like cash compensatory support, duty draw back, setting up of 100 per cent export-oriented units. A number of schemes for the development of marine product industry which is highly export-oriented, have also been formulated, it was added.

(Economic and Commercial News 20(16), 1990, 9)

## 221 Quantity of food products exported from India (Tonnes)

Products	1985-86	1986-87*	1987-88*
Fresh Fruits & Vegetables	223495	320902	196507
Canned vegetables	1370	971	916
Dehydrated vegetables	2409	1128	876
Pickles and chutneys	6352	5700	6360
Preserved fruits and vegetables	54770	46933	38120
Meat and meat products	37659	46818	59500
Marine products	83651	85843	97179
Confectionery and sweetmeats	545	70	NA
Biscuits	1157	821	1205
Guar gum	36084	28337	43947
Malted milkfood	306	892	821
Starch & derivatives	21	2683	1085
Papads	469	3343	3129
Other processed foods	2114	NA	NA
Cocoa products	249	69	151

\*Provisional NA: Not available  
(Productivity 30(4), 1990, 475)



## 222 Export of processed food products-major destinations with percentage share

Items	Major destination by % share (1985-86)
1. Fruit Juice	USSR (71%), Y.A.R. (13%)
2. Canned and Bottled Fruits	USSR (34%), Kuwait (23%), Saudia (78%), Y.A.R. (7%)
3. Dehydrated vegetables	F.R. Germany (26%), U.K. (10%), U.S.A. (9%), France (7.7%)
4. Pickles and Chutneys	U.K. (20%), U.A.E. (15%), Saudia (11%), U.S.A. (10%)
5. Frozen Meat	Malaysia (50%), U.A.E. (22%), Oman (10%), Kuwait (7%), Y.A.R. (6%)
6. Fresh Meat	U.A.E. (57%), Saudia (19%), Oman (18%), Bahrain (5%)
7. Canned Meat	Egypt (54%), Oman (14%)
8. Poultry Products	U.A.E. (39%), Maldives (18%), Nepal (11%)
9. Animal Casings	Spain (34%), Japan (24%), Holland (20%)
10. Confectionary and Sweetmeats	U.S.A. (55%), U.K. (24%), Nepal (18%)
11. Biscuits	U.A.E. (38%), Oman (16%), Maldives (11%)
12. Guar Gum	U.S.A. (48%), U.K. (7%), FRG (8%), Japan (7%), Netherlands (5%), France (5%), Spain (5%)
13. Guar Meal	Germany (30%), U.S.A. (23%), France (16%)
14. Wheat Bran	Bangladesh (34%), Nepal (33%), Sri Lanka (8%), Saudia (7%)
15. Malted Milkfoods	Sri Lanka (50%), Bangladesh (30%), Nepal (15%)
16. Starch and its derivatives	Bangladesh (50%), Sri Lanka (25%), USA (25%)
17. Papads	U.K. (47%), USA (8%), UAE (8%), Saudia (7%), Singapore (7%)
18. Cocoa Products	Germany (37%), Netherlands (36%)
19. Other Processed Foods	Nepal (19%), U.K. (15%), UAE (12%), Canada (10%)

(Productivity 30(4), 1990, 475)

## 223 MFP for buffalo meat raised

The Government has increased the minimum export price (MEP) of buffalo meat from Rs. 11.50 per kg f.o.b. to Rs. 13.50 per kg f.o.b. and for sheep/goat meat from Rs. 26 to Rs. 35 per kg f.o.b.

A public notice dated June 25 was issued here on Friday. Suitable amendments have been made in the export trade control order. (Financial Express 8 July 1990, 3)

## 224 Centre examining prospects of froglegs export

The Centre is examining the question of allowing export of froglegs on a limited scale, according to Marine Products Exports Development (MPEDA) sources here, reports PTI.

India, which had been one of the largest producers and exporters of froglegs since the last several years, banned the export in 1987 following stiff protests from environmentalists who said frogs played a vital role in the control of insects associated with agriculture.

Despite being the biggest exporter of froglegs in the early eighties, no efforts have been made so far to make a realistic estimate of the country's frog resources. Hence there is no scientific basis for the alleged depletion of the frog population and consequent ecological imbalance, according to seafood sources.

Three species of frogs were used for exporting froglegs - *Rana tigrina*, *Rana hexadactyla* and *Rana crassa*. Of these *Rana tigrina* alone contributed about 75 per cent of the export.

Unlike other marine products, the total world trade in froglegs was limited to about 10,000 tonnes per annum and India had a share of about 4000 tonnes during the peak period.

According to reports, illegal exports of froglegs to Bangladesh were going on consequent to the ban in India. The Border Security Force and other security agencies were reported to have been alerted.

Of late, the modus operandi was to export froglegs under the name of frozen fish. The consignments were sent by rail to Calcutta and from there they were transported by road to Bangladesh. Two months ago inspectors of the directorate of wild life preservation (eastern region) found about 1,500 kg of froglegs worth Rs. 1.2 lakh in a consignment of frozen fish.  
(The Economic Times 10 June 1990, 3)

## 225 New norms for rice, safflower seed export

The Government has announced special procedures for the export of safflower seed and non-basmati rice.

Exporters of safflower seed are required to register their contracts backed by 100 per cent irrevocable letters of credit with the Indian Oil and Produce Exporters Association (IOPEA), Bombay. Exports are permitted within a limit ceiling of which not more than 10 per cent will be allocated to an individual exporter. Allocation of ceiling will begin after May 23.

IOPEA will issue ceiling slips on first-come-first-served basis on fulfilment of the said conditions indicating full particulars such as exporter's name, number and date of the order or contract, letter of credit, quantity permitted, freight on board value and the destination.

The Port Licensing Authority concerned will issue guidelines within 48 hours of getting the ceiling advice from the IOPEA.

The new procedures also have a provision of penalising an exporter who fails to export the full quantity allocated. Such a person will be debarred from exporting the same commodity again. Further,



the procedures require that the exporter give the details to IOPEA and the port authority concerned within 15 days of the shipment from the expiry of the export licence failing which it will be assumed that the exports are nil and action would be taken accordingly.

IOPEA has to send a monthly statement to the Government indicating full details and immediately report if the ceiling is exhausted.

The same procedure has also been laid down for the export of non-basmati rice.

(Economic and Commercial News 20(21), 1990, 6-7)

## 226 Alcohol export front brightens

India is emerging as a major exporter of industrial alcohol, which has established itself as a potent source of foreign exchange earnings. About 615 lakh litres of alcohol were exported to overseas markets during 1989, which helped to rake in a foreign exchange earning of Rs. 240 million. Japan and Korea have shown interest in lifting industrial alcohol from India. A Japanese delegation was in India recently to discuss details about the quality and supply position of alcohol with the Indian manufacturers. India has already developed a capacity for the production of about 1,600 million litres of alcohol per annum. With the expansion of sugar production capacity in the near future, this is bound to increase rapidly.

In the domestic area, the utilisation of industrial alcohol has risen by 19 per cent during the alcohol year 1988-89. The exportable surplus for the current year is expected to be around 2,062 lakh litres. Out of this, if efforts are made to export about 2,000 litres of alcohol, it will bring in a foreign exchange earning of Rs.1,000 million, say industry sources.

(Chemical Products finder 8(12), 1990, 127)

## 227 Coffee exports go up

Coffee exports have gone up to 53.9 million kgs during April-September, 1989 as compared to 41.7 million kgs during the corresponding period in 1988.

The exports of coffee amounted to Rs.2021.1 million during April-September, 1989 as compared to Rs.1408.8 million during the corresponding period in 1988.

The export of coffee during 1988-89 was valued at Rs. 2797.1 million as compared to Rs.2632.2 million during 1987-88, an increase of 6.3 per cent.

To encourage exports, coffee has been exempted from the purview of export duty. The Minimum Release Price (MRP) had been revised in October 1988. To boost export of value-added items like instant coffee, the Government is offering Cash Compensatory Support (CCS) and Import Replenishment on exports of instant coffee. During the current year, the rate of CCS has been enhanced from 15 per cent to

20 per cent in the case of exports of instant coffee in consumer packs of 100 gms and from 10 to 18 per cent in the case of exports of instant coffee in bulk.

(Economic and Commercial News 20(16), 1990, 10)

## 228 Panel to monitor exporters' problems set up

The Union Commerce Ministry has issued a notification constituting an inter-ministerial committee to deal with the problems faced by exporters with regard to pre-shipment as well as post-shipment stages.

The Committee, which is called 'Export Facilitation Committee', and is headed by the Chief Controller of Imports and Exports (CCI & E), will also look into problems of generic nature arising out of the exporters' direct interaction with the various agencies in the Commerce or other ministries and departments.

The Committee, which will meet once a month, would propose solutions as also monitor and improve the speed of processing in order to resolve problems faced by exporters in a pragmatic and a positive fashion, according to the notification.

The committee will deliberate on the pre-shipment problems relating to availability of credit, inputs (both capital goods and raw-materials), collaborations, setting up of 100 per cent export oriented units (EOUs), promotion of markets, fixation of draw-back and its rates, besides transport infrastructure.

Similarly, it will also examine post-shipment problems like disbursement of incentives such as cash compensatory support (CCS), REP and additional licenses, duty-draw back as well as international price reimbursement scheme (IPRS), customs clearance and trade disputes.

The members of the Committee would include representatives of trade and industry besides government officials. The members include: the CCI & E (Chairman); member (Customs); three joint secretaries in the Commerce Ministry dealing with export services, export production and institutions); joint secretary (monitoring unit of the cabinet committee in the industry ministry); joint secretary (transport); joint secretary (banking); joint secretary (chemicals); deputy director-general in the Director-General Technical Development (DGTD); director (duty-drawback); a representative of the Industrial Development Bank of India (IDBI) and representatives of the EXIM Bank, the Export Credit and Guarantee Corporation; a representative each of the Federation of Indian Export Organization (FIEO), Associated Chambers of Commerce and Industry (ASSOCHAM), Federation of Indian Chambers of Commerce and Industry (FICCI) and the Confederation of Engineering Industry (CEI).

The committee has been authorised to invite other functionaries such as the collectors of customs, representatives of the export promotion councils and commodity boards as well as institutions like the Indian Institute of Foreign Trade (IIFT).



The exports commissioner is the member-secretary. He will provide secretarial assistance.  
(Economic and Commercial News 20(16), 1990, 8-9)

## Import

### 229 Import replenishment rate on marine products raised

The government today increased the import replenishment rate to 15 per cent from five per cent, with immediate effect, on exports of marine products.

Orders to this effect were passed by the commerce minister Mr. Arun Nehru.

Exports of marine products were worth about Rs. 622.5 crores in 1989-90 compared with Rs. 597.85 crores in the previous year.  
(Economic Times 9th June 1990, 1)

### 230 Government urged to scrap import duty on cloves, cassia

A strong-case has been made out by the All-India Spices Importers and Distributors Association for the abolition of import duties on cloves and cassia.

In a representation to the commerce minister, Mr. Arun Nehru, the association has drawn his attention to the serious setback which has been caused to trade by the large-scale smuggling of these items from Nepal and Sri Lanka.

In the case of cassia, the cost price including import duty and other levies, works out to Rs. 147.50 per kg, while the market price ranges from Rs. 120 to Rs. 125 a kg.

The cost price of cloves, on the other hand, including import duty and other levies, is stated to be Rs. 172 compared with the market price of Rs. 130 to Rs. 135 a kg.

On top of this imbalance in cost and market prices, there is an export obligation equivalent to 100 per cent of the import value. This obligation, obviously, will put an additional burden on the importers and make the imports totally unprofitable, Mr. Ratanlal, president of the Association, has pointed out in the representation made to Mr. Nehru on Friday.

The government is losing considerable amount of revenue as a result of the smuggling of the two items, the association has said.

The association hopes that as the minister responsible for the growth of trade and commerce, Mr. Nehru would take up the issue with the finance minister, Mr. Madhu Dandavate, and get the import duties abolished.

(The Economic Times 8 May 1990, 3)

### Trade Information

#### 231 Technology mission for pulses proposed

The Union government has proposed to extend the scope of the technology missions to cover the production of pulses.

As a first step, an integrated policy framework has been prepared for encouraging the production of pulses during the Eighth Five Year Plan. The policy emphasises on providing corrective incentives through the price mechanism and technology inputs. It will try and coordinate the interests of farmers, consumers and the industry.

The need for a mission was felt because pulses recorded one of the slowest rates of growth within the agricultural sector. The index number of agricultural production shows that the index for pulses went up to a mere 123.9 points in 1988-89 (base: 1969-70) from 104.4 points in 1970-71. In comparison, the index for rice went up from 107.4 to 181.2 points while wheat grew faster from 132.1 to 299.1 points. In this period, the index for all commodities went up from 111.5 points to 182.7 points.

Then again, the area under pulses remained stagnant in the last two decades at about 23 million hectares while the yield went up marginally by about 15 per cent as against an average agricultural yield growth of about 40 per cent.

In the prime pulse growing areas of Haryana and Punjab, the cultivation of pulses was replaced by wheat because it was found to be more lucrative.

A major impeding factor has been the differential between the price received by the grower and the retail price. The farmer is reported to receive only Rs. 4.50 per kg. of pulses while the consumer price is about Rs. 12.

(The Economic Times 27 May 1990, 1)



## 232 Some economic indicators in the food processing sector

Years	Gross value Added at 1980-81 Prices (Rs. Lakhs)	Gross Fixed Capital at 1980-81 Prices (Rs. Lakhs)	Total Emolu- ments at 1980-81 Prices (Rs. Lakhs)	Total Employment (Nos.)
1981-82	35501	97085	14696	453630
1982-83	35244	104168	16843	457880
1983-84	49723	131844	16463	425224
1984-85	52517	131844	16938	465277
1985-86	55853	134886	20032	443664

(Productivity 30(4), 1990, 468)

## 233 Support price for pineapple

The Tripura Government has announced support price of pineapple at 70 paise per kilogram for the current season. The State Agriculture Minister Mr. Nagendra Jamatia, told newsmen that this was the first time the State Government had announced the support price to prevent distress sale of the fruit, which grows in plenty in the State. NAFED and the State-level apex co-operative institution would make the purchase from different pockets for marketing in other States.

(Financial Express 23 June 1990, 9)

## 234 Development plan for oilseeds

The technology mission on oilseeds has proposed development plans, costing Rs.390 crore during the Eighth Plan. The plan includes an estimated additional annual recovery of 2.5 lakh tonne of edible oil and additional annual production of one million tonne of extraction free from toxic substance. The plan aims at making 40,000 tonnes of edible grade protein available at low prices. The plan will boost investment in technology and inputs to raise the oilseeds productivity. The need for edible oil processing industry to modernise its operations has been stressed.

(Chemical Products Finder 8(11), 1990, 169)

## 235 Hexane shortage pushes up bran oil price

The solvent extraction industry is concerned at a shortage of hexane (food grade), which is used as a solvent. Reports indicate that several solvent extraction units in Punjab downed their shutters for want of hexane after commencing work in the wake of market arrivals of the new paddy crop. As a result, rice bran oil prices have shown a contra-seasonal rise.

A strike by sheller mills in Uttar Pradesh over the State Government's levy policy has strengthened the market sentiment, according to trade sources. As many solvent extraction units are unable to operate to their full capacity because of scarcity of hexane offerings of soyabean and other oils have been reduced, causing their prices to look up.

(The Oils and Oilseeds Journal 42(4-6), 1989, 47)

## 236 Oil store limit for vanaspati units reduced

The Government has decided to reduce the stock limit of edible oils in vanaspati with the producers from the existing level of one twelfth of the annual capacity to one twenty-fourth of the annual capacity.

It was also been decided to reduce the stock limit of oilseeds by restoring the limit to the level prevalent in early March 1990.

The higher stock limit for mustard seeds which was three times of the other oilseeds has now been revoked. The order will come into force with effect from July 2.

These measures are likely to result in releasing additional oil, vanaspati as well as oilseeds into the market, thereby, easing the pressure on prices, according to an official release.  
(Financial Express 26 June 1990, 1)

## 237 Maharashtra gur traders down shutters

More than one thousand gur traders all over Maharashtra have downed their shutters for three days since yesterday, in protest against the proposals of the state government to impose two per cent sales tax on gur, UNI reports.

Mr. Deepak Shah, convener of the action committee for abolition of sales tax on gur, told reporters here today that the state government would lose about Rs. 10 crores during the three days and traders from all over Maharashtra would also lose business around Rs. five crores per day.



## 238 Solvent extraction processing of oilcakes and rice bran

		1988-89		1987-88	
Sr. No.	Commodity oilseeds/ oilcakes/ rice bran	Production		Production	
		Quantity processed (M.T.)	Extraction (M.T.)	Quantity processed in (M.T.) (estimated)	S.E. oil (M.T.)      Extraction (M.T.)
1.	Rice bran	23,00,000	3,45,000	21,30,000	3,20,000      17,75,000
2.	Groundnut cake	10,00,000	70,000	3,00,000	21,000      2,75,000
3.	Cottonseed cake	1,00,000	6,000	1,00,000	6,000      92,000
4.	Soyabean	10,50,000	1,88,000	7,00,000	1,26,000      5,60,000
5.	Mustard/ rapeseed cake	3,75,000	30,000	2,65,000	26,000      2,36,000
6.	Sunflower seed cake	2,25,000	27,000	2,00,000	25,000      1,72,000
7.	Sesameseed cake	50,000	4,000	-	-      -
8.	Salseed	55,000	6,500	1,05,000	13,000      91,000
9.	Safflower oilcake	25,000	1,700	35,000	2,500      32,000
10.	Linseed oilcake	-	-	1,100	80      1,000
11.	Other newer oils & tree origin oilseeds	2,30,000	25,000	1,60,000	15,000      1,41,000
Total		54,10,000	7,03,200	39,96,100	5,54,580      33,75,000

(Poultry Guide 27(3), 1990, 107)

## 239 Profit on soft drinks

Trading in soft drinks has turned out to be a rewarding business activity for Usha Rectifier Corporation. The company sold 365,145 crates of soft drinks during 1989 and realised sales income of Rs. 111.81 lakhs. The unit value of sales works out at Rs.0.31 lakh per thousand crates.

What was the unit value of purchases for the company? It purchased 368,300 crates at a value of Rs.88.92 lakhs. The unit value works out at Rs. 0.24 lakh per thousand crates. The trading profit in soft drinks sales works out at Rs. 22.89 lakhs.

The profit before tax of the company during the year has been Rs.1265 lakhs. That means around two per cent of the profits has come from purchase and sale of soft drinks for this electrical goods sheets manufacturing company. Another moot point is that arithmetic of stocks of soft drinks in the annual report is rather puzzling.

Incidentally income from sale of soft drinks has more than doubled during 1989 over the previous year - from Rs. 46.58 lakhs to Rs. 111.81 lakhs.

(The Economic Times 9 July 1990, 7)

## 240 Spices unit in Kerala

The Regional Research Laboratory (RRL) here has submitted a project report to the state horticultural development corporation on setting up a spices processing unit based on the know-how developed by RRL, reports PTI.

Disclosing this at a press conference here, the RRL director, Dr.A.D.Damodaran, said the proposal was under the active consideration of the state agriculture ministry which wanted it to be included in the European Economic Community (EEC) assisted package of programmes.

The idea was to market processed spices, instead of raw spices, with the aim of fetching better profits to government and commensurate returns to farmers.

The RRL, Dr Damodaran said had developed a technology to process raw pepper into white pepper, which would command better prices in the world market..

He also disclosed that a demonstration plant, based on technology developed at the RRL for processing coconut milk, was to be set up at Kochi shortly.

(The Economic Times 10 June 1990, 6)



## 241 No ST on papads

The Tamil Nadu government on Monday announced that papads would be totally exempted from sales-tax. This was announced in an official press release here.

(The Economic Times 31 May 1990, 10)

## 242 Milk utilisation pattern in India

(Percentage)

Particulars	1984-85	1985-86
Liquid milk	46.0	46.0
Milk powder*	3.0	3.6
Ghee	28.0	28.0
Butter	6.5	6.5
Khoa	5.5	5.5
Cream	0.5	0.5
Curd	7.0	7.0
Ice-cream	0.7	0.7
Cheese**	2.0	2.0
Others	0.8	0.2

\* Includes infant milk food

\*\* Includes cottage and processed cheese

(Khadi Gramodyog March 1990, 276)

## 243 Rice mills in India

Year	Hullers	Shellers	Hullers cum Sheller	Modern/ Modernized Mills	Total
1978	70,305	3,257	8,203	3,207	84,972
1983	79,799	5,841	9,034	12,647	107,321
1988	84,485	4,678	9,845	26,753	123,671

Source: Rice Milling Cell, Government of India  
(SEA News Circular June 1990, 21)

## 244 UK firms offer expertise in food processing

The food processing industry of the UK has offered to assist Indian companies in technologies, equipment and services since they find a great potential in India for food processing industry. Dr. Ronald Watkins, Chairman, High Value Horticulture (HVH) PLC was in

India for three decades, first for ICI and then for Richardson Hindustan. HVH has been approached by Sikkim, Arunachal Pradesh and Meghalaya for assistance in formulating horticulture development plans, according to Dr Watkins. He is hopeful of finalising one or two joint venture agreements with Indian companies. A British food processing trade mission was in India in October last year, of which Dr. Watkins was a member. The mission identified areas in which the UK companies can play a meaningful role.  
(Industrial Products Finder 18(7), 1990, 115).

## 245 Food testing lab set up

The Federation of Indian Chambers of Commerce and Industry (FICCI) and its specialised wing for food industry, Confederation of Indian Food Trade and Industry (CIFTI) have set up a food testing laboratory at New Delhi to provide facilities to food processors and traders for analysing all types of food articles. These include edible oils and fats, milk and milk products, food grains and cereal products.

The FICCI-CIFTI laboratory set up with the assistance of Industrial Development Bank of India (IDBI) is having state of art technology for testing food articles to check the presence of contaminants, mycotoxins and the like in the food articles. The import and export units engaged in food trade can also get their food articles analysed to ensure that their products conform to the quality prescribed by the statutory agencies and importing countries. The laboratory will provide facilities for analysis as per the standard prescribed under Prevention of Food Adulteration Act (PFA) rules and Bureau of Indian Standards.

According to a release, the new laboratory will be accessible to the food processors and traders. They can get the testing and analysis done within a short span of time at a very nominal cost.

Besides this would help in building up quality consciousness in the food processing industry since most of the medium, small and cottage industries are not fully aware of the importance of adequate quality control and do not have the resources to invest in quality control systems.

Another function of the FICCI-CIFTI laboratory will be to help industry by providing technical knowhow for improving the quality and to ensure longer shelf life to the products.  
(Chemical Weekly 25(43), 1990, 68)



## Food Regulation, Quality Control & Hygiene

- 246 A new yellow colorant for food contact plastics approved in USA.

A new yellow colorant for plastics developed by Ampacet Corp. (USA) has been recently approved by FDA in USA for food contact plastics. According to the company, the new colorant exhibits the same opacity and colour values as lead chromate colorants, which do not have FDA approval for food contact. The new yellow colorant has been developed for the blown and cast film industries. (Chemical Weekly 35(34), 1990, 99)

- 247 Spices Board Act to be amended

The Spices Board Act will be amended to enlarge the scope of the activities of the board. Mr. K.N. Ardhanareeswaran, special secretary in the Union Commerce ministry, said on Sunday, reports PTI.

The amendment would be introduced in the next session of the parliament, he said while inaugurating a quality evaluation and upgradation laboratory of the Spices Board here.

Mr. Ardhanareeswaran said the Board's activities which was now confined mainly to the development of cardamom and pepper, should also be extended to other minor spices.

The Board should introduce new spices crops and function as a "clearing house" for these products by providing all help to farmers, processors and exporters, he said.

The concept of 'inspection' should change and the export inspection agency should function as an export facilitation agency, providing all necessary backups to the exporters, he said. The Spices Board should also function as a communicator between the foreign buyers and Indian exporters.

The Spices Board chairman, Mr. K.M. Chandrasekhar, in his address said the cardinal function of the quality evaluation laboratory would be to test quality of spices to be exported under the logo of the Spices Board. (The Economic Times 26 June 1990, 3)

## 248 BVOs not carcinogenic

Parle (Exports), manufacturers of Limca and Gold Spot, has said that Brominated Vegetable Oils (BVOs), banned by the government on April 15, is not carcinogenic and is allowed in the US. In a press statement issued on May 20th, at New Delhi, the company quoted the Food and Drugs Directorate, US, stating that no evidence existed that the consumption of beverages containing BVOs had produced harmful effects in humans.

However, the director of the department of prevention of food adulteration, Mr. P.N. Gupta, said the use of BVO in America is allowed only upto a concentration of 15 ppm. Parle has not specified the concentration BVOs in its old stock. Parle has asserted that BVOs is not carcinogenic but the company is silent on other harmful effects of the banned product.

The Monopolies and Restrictive Trade Practices Commission, in its investigation of the soft drinks case, noted that studies in the US had shown that the use of BVOs even in the concentration of 0.5 per cent causes growth retardation, impaired food assimilation, slight amnesia and enlargement of the heart. Parle has said that old products are not in the market. The press statement also gives reasons why Limca and Gold Spot were not withdrawn when the ban notification was issued.

(Chemical Weekly 35(38), 1990, 68)

## 249 New and revised Indian Food Standards

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- |    |                         |   |
|----|-------------------------|---|
| 1) | IS 3839 : 1989          | Food Yeast - Specification<br>(first revision). Gr.4  |
| 2) | IS 5969 (Part 10): 1988 | Meat and meat products - Methods<br>of test: Part 10 Measurement<br>of pH. Gr.3                                     |
| 3) | IS 5969 (Part 11): 1988 | Meat and meat products - Methods<br>of test: Part 11 Determination<br>of glucono - delta - lactone<br>content Gr.3. |
| 4) | IS 5960 (Part 12) 1988: | Meat and meat products - Methods<br>of test: Part 12 Determination<br>of L-(+) - glutamic acid<br>content. Gr.3     |
| 5) | IS 5960 (Part 13) 1988: | Meat and meat products - Methods<br>of test: Part 13 Determination<br>of polyphosphates. Gr.3                       |



- |     |                         |  |
|-----|-------------------------|--|
| 6)  | IS 5960 (Part 14): 1988 | Methods of test for meat and meat products: Part 14<br>Determination of starch content. Gr.4.  |
| 7)  | IS 12516 (Part 4): 1988 | Method for Determination of physical characteristics of doughs made from wheat flour: Part 4<br>Rheological properties using an alveograph. Gr.5 |
| 8)  | IS 12541: 1988          | Meat and meat products - Poultry - chicken curry, canned - specification. Gr.2   |
| 9)  | IS 12542 : 1988         | Meat and meat products - Canned ham, minced - specification. Gr.2  |
| 10) | IS 12616: 1989          | Pesticide residues in foods - Cypermethrin, deltamethrin, fenvalerate and permethrin - Method for determination, Gr.2.                           |

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(Standards India February, March, April 1990)

## 250 Use of mustard oil in vanaspati disallowed

The Government has decided to discontinue the permission for use of mustard oil (expeller) in vanaspati with immediate effect, it was officially stated today.

This is in view of the increase in prices of mustard oil in the market. The use of mustard oil (expeller) to the extent of 20 per cent in vanaspati was permitted by the Government since March 14 this year.

(The Hindu 7 July 1990, 10)

## 251 Dried banana powder: An anti-NUD agent

Dried banana powder might turn out to be a useful agent in the treatment of nonulcer dyspepsia (NUD), according to researchers at the All India Institute of Medical Sciences, New Delhi.

A study conducted by AIIMS researchers shows that dried banana powder is a safe and effective treatment for NUD, a condition marked by chronic abdominal pain, nausea and cramps.

The fact that banana powder is cheap, easily available and is a part of traditional Indian food prompted the researchers to investigate its properties as an anti NUD agent.

The preliminary AIIMS investigation involved 46 patients with NUD in a prospective, randomised controlled trial.

The symptoms were partly or completely relieved trial within eight weeks in 75 per cent of those undergoing the treatment but only 20 per cent of the controls.

(P.T.I. Science Service 9(8), 1990, 4)

## 252 Overcooked meat may cause cancer

Researchers in South Australia have established a link between overcooked meat and the presence of carcinogenic chemicals in the human body.

A team at the Flinders Medical Centre, Adelaide has found that 12 chemicals in a group known as aromatic amines were formed by chemical reactions in meat and fish at 200 to 3000 C.

They are formed through an interaction between amino acids, creatinine and sugar, harmless compounds present in the food. These food-derived aromatic amines are among the most mutagenic compounds so far isolated. Nine of the 12 have already been shown to cause cancer in rats and mice. Work is now needed to discover what effect the chemicals would have on humans.

Since most chemicals require metabolism before being carcinogenic, it means that the level of enzymes in the body, responsible for this process, is critical if a person is going to suffer a toxic response exposure to these chemicals.

Genetic and environmental factors had been shown to change enzyme levels in the body and researchers are trying to discover if there was a link between the enzymes, food-serviced aromatic amines and human cancer.

Researchers believed that diet was underestimated as a route for exposing people to potentially toxic chemicals.

A United States survey estimated that industrial pollution contributed to only about 50% of human cancers but diet could contribute to 35%.

People who eat medium-cooked or raw meat are helping their bodies more than those who favour well-done or overcooked meat. And the best way to cook meat is in a microwave, and then discarding the juices, where most of the compounds are found.  
(Journal of Scientific and Industrial Research 49(4), 1990, 199-200)

## 253 Oily fish helps heart attack victims to live longer

A new study by researchers at the Medical Research Council's Epidemiology Unit, Cardiff, suggests that eating oily fish two or three times a week may reduce the rate of death among men recovering



from a heart attack by almost a third. Fish fingers made of mackerel rather than cod might save some Britons from a second heart attack.

In a carefully controlled trial of more than 2000 men, 94 subjects who consumed a modest amount of fatty fish over two years died compared with 130 who followed different diets. According to the researchers this net difference of 29% was very unlikely to have happened by chance.

Although earlier studies have shown that people who choose to eat fatty fish several times a week tend to have a lower risk of dying from heart disease, this is the first investigation to show that such a modest change in diet may help prolong the lives of people who have already had a heart attack.

The focus was on three types of dietary advice, and different groups of men recovering from a heart attack were told to do one or more of the following: eat less fat, especially saturated fat; or eat at least two weekly portions of between 200 and 400 g of fatty fish (mackerel, herring, kipper, pilchard, sardine, salmon or trout). Most of the fish that Britons eat is white fish, such as cod, plaice and haddock. These contain much less of the beneficial fish oils.

The eight groups were given different combinations of this dietary advice; one group received no dietary advice. Subjects who disliked the fish prescribed in their diet took three capsules of fish oil a day.

According to researchers, the men who were advised to eat fish were less likely to die of a heart attack in the two years of the study. Yet diets low in fat may still benefit people who have had heart attacks, even though benefit showed up in this study. One problem was that many men outside the low-fat group nonetheless spontaneously reduced their intake of saturated fat, blurring the distinctions between the groups. And the men advised to reduce fat found it difficult to stick to the diet.

It is speculated that the benefits of reducing the intake of fat, and so lowering levels of cholesterol in the blood, may take more than two years to affect death rates. Fish oils probably produce a more immediate benefit, lowering the risk of a fatal heart attack. Fatty fish contains high levels of eicosapentaenoic acid (EPA) which the body metabolises in complex pathways to produce various substances, notably prostaglandins.

EPA in the diet enhances the levels of prostaglandins that reduce the tendency of the blood to clot. This may also prevent fibrillation - the uncontrolled contraction of the heart muscle during brief periods when it is starved of oxygen. This could explain why eating fatty fish lowered the risk of death, but not the risk of having another heart attack.  
(New Scientist No.1685, 1989, 25)

## 254 Caffeine and automobile driving

Thirty minutes after ingesting 200 milligrams of caffeine or a placebo, each of 24 male subjects drove an automobile simulator for 90 minutes. Immediately thereafter, the subject ingested again either 200 mg of caffeine or a placebo, and then drove for another 90 minutes. The simulator provided a comprehensive and coherent set of stimulus inputs which produced a degree of realism not usually found in laboratory studies. Both the initial and the supplemental doses of caffeine significantly enhanced performance beyond that found with placebo, on each of four measures of alertness.  
(Indian Coffee 54(6), 1990, 20)

## 255 "Methi" cure

Seeds of fenugreek (methi) taken daily will not only control diabetes but also reduce cholesterol. Studies at the National Institute of Nutrition in Hyderabad show fenugreek is effective even in type-one diabetics who depend on insulin. Fenugreek seeds markedly lower the glucose level in blood and by as much as 64% in urine. The results are noticeable in 10 days.  
(Deccan Herald 17 July 1990, 13)

## 256 Nickel content in vanaspati high

Scientists of the Environmental research laboratory here have found that there is very high concentration of nickel in four leading brands of hydrogenated vegetable oil (vanaspati) in the country.

Giving details about the laboratory's 'Citizen's action programme', under which the research was carried out, the executive director of the research laboratory, Dr. M.C.Saxena, said higher incidence of cardiac arrests, cancer and vulnerability to other common diseases, may be attributed to polluted ecology and severe food contamination.

Dr.Saxena, said vegetable oil constituted an integral part of food for it was used as the sole cooking medium.

Assuming that an average person consumed 40 grams of vegetable oil every day, the total intake of nickel, through vegetable oil alone, will be approximately one mg per day per person.

Dr.Saxena said 800 million people in the country were thus unknowingly consuming a high content of toxic nickel through the hydrogenated vegetable oil without realising the toxic potential of the element.

Nickel is one of the most toxic metals after lead and mercury known to accumulate in the atmosphere and poses a health hazard to humans.

(The Times of India 2 July 1990, 6)



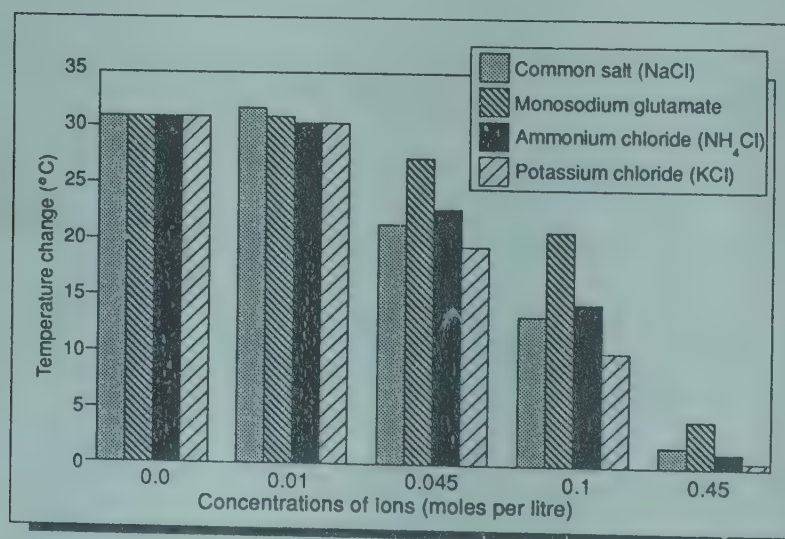
## 257 Salty food and microwaves

Microwaves cannot easily penetrate salty food, according to microbiologists from the University of Leeds. Their finding could help to explain why outbreaks of food poisoning, caused by the listeria and salmonella bacteria, have increased recently. It may simply be that the interior of salty packaged foods that are cooked or reheated in microwave ovens are not reaching high enough temperatures to kill such organisms. The salt contains ions which can be made to flow by the electric field in microwave radiation, sapping its energy near the surface of food.

Stephen Dealler and Richard Lacey were carrying out tests to find how effectively microwave ovens destroy salmonella and listeria in food. They added the bacteria to 10 different pre-cooked dinners, then heated them according to the manufacturer's instructions. The ovens they used - 10 different makes - all met the safety standards set by the British government last year.

Dealler and Lacey heated the food for the time specified on the packets. But they found that roughly half of the bacteria survived. This contradicted the results obtained by government scientists. The two Leeds researchers noted that the government trials had been carried out on samples of unsalted mashed potato. The food they themselves had tested, on the other hand, contained salt.

The researchers decided to investigate how the concentration of various salts in food affects the effectiveness of microwave heating. First, they measured the concentration of ions in unsalted mashed potato at 8°C. Then they added several salts - ordinary table salt, ammonium chloride, potassium chloride and monosodium glutamate - in various concentrations to various samples. Finally, the researchers heated each sample for one minute in a common domestic microwave.



*Cool at the core: As the concentration of ions in mashed potato is increased, the interior receives less heat. In each case, a 200-gram sample was heated for one minute in a 650-watt microwave oven*

Immediately after heating, Dealler and Lacey measured the "core" temperature of the mashed potato. They found that the samples with the greatest concentration of ions had the coldest interiors (see Figure).

Dealler and Lacey believe that their results can be explained if microwaves induce currents in the surface of food with high concentrations of ions. The currents sap energy from the microwaves before they can penetrate the food to heat the core. This mechanism may also explain, they say, why food heated in microwave ovens commonly boils on the surface but is cool on the inside. "The induction of ionic currents by electro-magnetic radiation is not yet a recognised phenomenon, as far as we know", say the researchers. Manufacturers of pre-cooked foods have to use salt to preserve and flavour of food. (New Scientist No.1713, 1990, 28)

## 258 Gene probes may help to spot listeria in food

The foods we buy could soon be free of the bacteria that cause listeriosis, a disease that can trigger miscarriages and kill people with weakened immune systems. A two-year programme, led by Ray McKee of the Institute of Food Science in Norfolk in Britain, aims to develop a DNA-based test that identifies the bacterial culprit, *Listeria monocytogenes*, in minutes.

The Public Health Laboratory Service in Britain has identified *L. monocytogenes* in a number of foods, mainly soft cheeses, pate and cook-chill meals. Unusually, the organism survives at temperature down to 1 °C, which means it can continue to grow in food even when stored in refrigerators. Also, the government's Committee on the Microbiological Safety of Food says that, at any one time, the organism is detectable in the digestive tracts of one in 20 of us.

The existing test for *L. monocytogenes* takes up to 10 days to yield results because analysts have to wait to see whether the bacteria grows on a suspect sample cultured in the laboratory.

A spokeswoman for the IFS said that McKee's team aims to base a detection system on "gene probes", synthetic strands of bases that bind uniquely to specific strands of DNA in a target organism. By tagging the probes with a marker, such as an atom that discharges detectable levels of radiation or light, analysts can tell almost immediately whether the target organism is present in a treated sample.

McKee and colleagues are to design the probes mainly for use in the food industry so that processors can trace signs of contamination anywhere in the production line, then identify the source.

Industry and government are funding the project jointly under the Link initiative, which promotes collaborative research between the public and private sectors. The Ministry of Agriculture, Fisheries and Food and the Department of Trade and Industry will between them pay £ 145 000. Unilever Research and Marks and Spencer will pay the same amount.

(New Scientist 9 June 1990, 39)



## 259 Vegetables fight cancer

Those who eat more cabbage, broccoli, Brussels sprouts, cauliflower, garlic, onions, scallions and leeks have a lower incidence of cancer than those who eat smaller amounts of these foods, according to an article in the journal of the national cancer institute, reports PTI from Washington.

Two scientists from the institute for hormone research in New York, Dr. Leoubradlow and Dr. Jon Michnovicz, said they found that vegetables such as cabbage and broccoli contained a chemical known as Indole-3-carbinol which reduced breast cancer risk by speeding up a particular process by which body metabolised the female hormone estrogen.

(The Times of India 13 June 1990, 11)

## 260 Ghee safe for heart patients

Longer considered to be harmful for the heart, according to the vice-chairman of the Heart Care Foundation of India, Dr K.K. Aggarwal.

Exploding the popular myth about the cooking medium at the first heart check up camp, at Khurja, near Delhi yesterday, Dr. Aggarwal stated that ghee does not produce free radicals in the body which cause atherosclerosis or narrowing of the arteries due to the deposition of fat, leading to heart attacks and strokes. On the other hand, it raises the body's resistance and its own enzymes act as a scavenger in the body, according to him.

Dr. Aggarwal advocated the use of ghee for all those who did not have a high cholesterol level in the blood. It was the use of artificial fertilisers, weed killers and insecticides which were the major factors in the causation of atherosclerosis and heart diseases.

(The Times of India 8 May 1990, 5)

## 261 Fried chicken

American poultry can now be exposed to gamma radiation to kill organisms that cause disease. The US Food and Drug Administration approved the process last week, marking the first time that the government has approved the irradiation of solid food.

Manufacturers may administer up to 3 kilograys of ionising radiation to the poultry. Such irradiation kills most of the bacteria in the food, but the poultry must still be refrigerated to prevent the remaining microbes from multiplying. The agency emphasised that the process does not make food radioactive.

Irradiation will extend the shelf-life of poultry and decrease the incidence of food poisoning in the US, according to FDA officials. Poultry contaminated by the bacteria *Salmonella*, *Yersinia*, *Campylobacter* and other microbes causes 10 per cent of all food-borne illnesses present in the US, according to the FDA.  
(New Scientist No.1716, 1990, 31)

## 262 Synthetic food for diabetics

A Japanese company, Terumo Kabushiki Kaisha, has filed a European Patent (No. 323,510) on a synthetic food which it claims can prevent overeating and help diabetics to control the level of glucose in their blood.

Mechanical extension of the stomach inhibits appetite. Medical methods of extending the stomach wall, for instance by inflating a balloon in the stomach or stapling the walls require surgery and may have unpleasant side effects. Their answer is to provide a foodstuff that stays in the stomach for a long time and fills the space.

This is normally difficult because acidic juices in the stomach reduce the viscosity of food. The new material is a mix of water-soluble fibre, such as carrageen or guar gum, with protein, such as sodium or calcium caseinate. This mixture forms a gel in the stomach which absorbs water and some of the sugar in food and drink eaten subsequently. The sugar is thus prevented from passing through the stomach wall and into the blood and the gel stops the patient from feeling hungry.

The company claims that glucose levels in the blood of diabetics were lower when they ate the gel before dining.  
(Chemical Weekly 35(34), 1990, 99-100)

## 263 HPLC and egg cholesterol level

Eggs are generally assumed to be high in cholesterol and people at risk to heart attack are warned to be cautious in their intake. However, researchers recently have shown that the data should be re-evaluated. Current data were obtained by colorimetric determinations and are too high by a factor of 30%. Using high performance liquid chromatography (HPLC), the researchers found 10.97 mg. of cholesterol per gm. of wet yolk compared with figure of 13.86 mg. obtained by a calorimetric method of saponified egg yolk.  
(Chemical Weekly 35(34), 1990, 97)

## 264 A non-polluting cleaning process

A new chemical cleaning method removes contaminants from high-purity process systems in the pharmaceutical, biotech, food and beverage and other industries in a more environmentally safe manner than existing methods reports Cal-Chem Corp. of South El Monte California.



The method called SCRP (for specific chelation, reduction and passivation), can be used to clean piping, tubing, tanks, vessels, valves and fittings in systems that transport water, air, steam, nitrogen, oxygen and other materials.

Current cleaning standards set by ASTM and the American Society of Mechanical Engineers specify the use of mineral acids for such applications. However, mineral acids extract toxic heavy metals that can contaminate high-purity systems and are difficult to dispose off. The SCRP process uses non-toxic organic acids (such as citric acid) and chelants that do not extract heavy metals, making it possible to dispose of solutions in sanitary sewer systems.

Cal-Chem is now seeking to revise ASTM and ASME cleaning standards to incorporate its system as an alternative to use of mineral acids.

(Chemical Weekly 35(32), 1990, 91-92).

### Transfer of Technology & New Industries

#### 265 Lever, MPEDA Tie-up for shrimp farming

The Marine Products Export Development Authority (MPEDA) has entered into a tie-up with Hindustan Lever Ltd (HLL) for shrimp farming. HLL has achieved a technological breakthrough at its Sandeshekeli aquaculture farm in the Sunderbans in West Bengal. HLL has expressed its willingness to transfer the technology free of cost. The deal has the support of the Department of Biotechnology.

In order to help individual entrepreneurs in such ventures, MPEDA is negotiating with the National Bank for Agriculture and Rural Development (NABARD) and financial institutions for fund support. During the current year, MPEDA has invested in the equity of eight companies engaged in either processing marine products or exports. In 1990-91, MPEDA has sought a doubling of its previous year's allocation of Rs.25 lakhs.

(Chemical Products Finder 8(12), 1990, 136)

## The BVO Story

C. L. Nagarsekar

The Indian soft drink industry which has a turnover of over Rs.700 crores in the organized sector, and a similar quantum in the unorganised sector was left high and dry at the peak of this summer season. With effect from April 16, 1990, Government of India imposed a ban on the use of brominated vegetable oils (BVO), widely employed as an emulsifying agent in citrus flavoured soft drinks and synthetic beverage powders. Goldspot, Limca, Campa Orange, Duke's Lemonade, Rush, Tingler, Tripp were some of the leading soft drink brands suspected to be using BVO, along with Rasna and others. The industry was not fully equipped with a substitute for BVO although BVO has been a controversial ingredient at the International level for over 20 years.

BVO is an emulsifier used all over the world for the

past 3 decades. It is a brominated vegetable oil (olive oil, cottonseed oil, corn oil, safflower oil, sesame oil, etc.) wherein bromine is added across some of its double bonds. BVO is used in the formulation of carbonated and noncarbonated citrus flavoured beverages to adjust the density of flavour emulsions and to prevent the separation and deposition of these flavouring ingredients as a ring in the neck of the bottle. BVO modifies the specific gravity of the flavoured oil which is usually lighter than that of water. Thus, a stable emulsion cloud is formed when BVO is added and it gives the beverage desired body, cloudiness as well as a vehicle for the flavour dispersion.

It was in late 1960s that BVO came under a cloud when World Health Organization (WHO) expressed the

***Excerpt from the letter written by Dr. J. C. Munro  
to Director General of Health Services, India:***

*"I am writing to the expert group of the Central Committee for Food Standards to provide additional independent information on the safety of brominated vegetable oil (BVO). I am writing at the request of Dr. Nancy Higley, Chairperson of Beverage Emulsion Stabilizer Committee of the International Life Sciences Institute. Dr. Higley presented information at the October 6, 1989 meeting of the expert group supporting the use of BVO at 15 ppm. She feels that the additional information I will present below could help the expert group in its deliberations.*

*I am currently Director of the Canadian Centre for Toxicology in Guelph, Ontario, Canada, a position I have held for the past four years. Prior to that, I was employed for approximately 20 years by the Federal Department of Health and Welfare of Canada where I held various positions including Director General of Food Directorate. In this position, I was responsible for the safety of all the foods sold in Canada. I have also served for many years on the FAO/WHO Joint Expert Committee in Food Additives as an expert on food toxicology.*

*My interest in the safety of BVO goes back many years, indeed it was through the work I did while in the laboratory that the toxicity associated with BVO first came to light. On the basis of my investigations the Canadian Government, along with the Government of many other countries, took action in early 1970s to set the use of BVO at the currently acceptable level of 15 ppm.*

*The basis of 15 ppm arose as a result of studies we conducted on laboratory animals which clearly demonstrated that below a daily dose of 50 mg/kg of BVO no toxic effects were seen. The acceptable daily intake for humans was established at 1/100 (one hundredth) of that dose 0.05 mg BVO/kg body weight/day.*



fear that the consumption of BVO could be problematic. Extensive studies were carried out on BVO at the Food and Drug Directorate of Canada by a team of several workers led by Dr. J. C. Munro. Their published work indicated that rats fed the diet containing 0.5 to 2.5% of BVO for 80 days developed degenerative myocardial lesions, alterations in lipid profiles of liver, thyroid microfollicular hyperplasia, and renal proximal tubular degeneration. The myocarditis associated with BVO feeding was characterised by edema, fatty changes and myocytolysis with subsequent progression to necrosis.

The level of BVO in these experimental diets was quite high and the subsequent experiments by the team indicated that similar effects were noted in the heart and kidney of rats fed 0.5% but not 0.1% or 0.02% of BVO in the diet for 120 days. Fatty infiltration of the liver was observed at 0.5% and 0.1% levels but not in those fed at 0.02% level.

Further animal studies conducted at the Children's Hospital Research Foundation, Cincinnati, USA, indicated behavioral birth defects because of consumption of high doses of BVO. Toxicological investigations further indi-

cated that BVO being a lipid may accumulate at low levels in the tissues of both animals and humans, exposed to the substance. However, research for over past 2 decades has not conclusively proved that BVO is carcinogenic. Based on these studies, Dr. J. C. Munro himself wrote on Nov. 23, 1989 to the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India recommending that the use of BVO at levels below 15 ppm could be allowed [see box].

As of today, 129 countries have banned BVO primarily because of WHO alert. In U.K. and some Gulf countries, it was banned more than 10 years ago. USA, Canada, Belgium, Sweden and Netherlands have permitted the use of BVO within 15 ppm. The USA, which entered this ban fray only last year uses Estergum at 100 ppm maximum along with 15 ppm BVO; while in Canada BVO is used in combination with Sucrose Acetate Isobutyrate (SAIB).

The banning of BVO in India is a long story. In pursuance of WHO alert, the Food Technology and Science Subcommittee, in 1970, recommended phasing out the use of BVO as food additive. This was readily accepted

*The factor of 100 used in extrapolating the laboratory data to humans provides a wide margin of safety insofar as human exposure is concerned and moreover is accepted internationally as an appropriate method of ensuring no harm could come to humans consuming products containing BVO. In order to ensure that the acceptable daily intake of 0.5 mg/kg/day was not exceeded, an upper limit of 15 ppm of BVO used in soft drinks was established.*

*Between 1970 and the present, several further studies have been conducted on BVO including metabolism studies and additional toxicological investigations. It is now well established that BVO or its metabolites may accumulate, at low levels in the tissues of animals or humans exposed to the substance. This is not surprising because, it is handled in the body much like any other source of dietary fat. However, in chronic animal studies in which animals were exposed to dietary levels several orders of magnitude in excess of any possible human exposure, the tissue accumulation of BVO did not produce any adverse effects either in terms of chronic toxicity or generic changes. Thus, in my view, the minimal accumulation one might expect to find in humans consuming BVO-containing foods, is of no toxicological consequence. This view is endorsed by the Canadian Government and the Food and Drug Administration (FDA) of United States, both of which continue to permit the use of BVO in accordance with the 15 ppm limit. I might add that BVO is used at the 15 ppm limit in many other countries as well. At the present time, there is no indication that any further restrictive action is necessary.*

*As you know, BVO is of considerable technological benefit in maintaining proper suspension of flavouring and colouring ingredients in beverages. There is, at present, no entirely acceptable alternative substance for this use. In Canada, BVO is used in combination with sucrose acetate isobutyrate which is also permitted for this purpose. The combination of these agents is essential to ensure proper product formulation and consumer acceptability of soft drink products."*



by the National Health and Medical Research Council but no follow up action was taken. In 1974, the Food Additives Subcommittee expressed concern over the non-implementation of the phasing out of BVO and recommended to the Food Standards Subcommittee a ban on BVO from January 1, 1975. As there was no suitable substitute available the issue lingered on. In 1979, the Subcommittee ultimately forced the Government to issue a notification seeking public opinion on the ban, but the Prevention of Food Adulteration Act was never amended to actually ban the additive. Once again on 15th April 1988, the Government issued a notification banning BVO as an emulsifying and stabilizing agent, but the representatives of beverage industries pleaded for an alternate substitute for BVO which was not readily available—and the ban was kept in abeyance for 2 years. Finally, in mid 1989, the Consumer Unit and Trust Society (CUTS) of Calcutta, filed a case against the Government of India for its failure to implement the ban imposed on 15.4.1988. Justice V.B. Eradi of the National Consumer Disputes and Redressal Commission, Delhi, issued an order on September 13, 1989, calling upon the Government to fulfill its commitments within 3 months.

But for this order, the decision of the Government could have been still prolonged. That the Government is not yet convinced is obvious from the sworn affidavit filed by its officials in court admitting that the BVO studies were not complete and the WHO studies remain inconclusive as yet.

The statistical data on the Indian soft drink and beverage industry for 1988 shows the following:

1. Aerated soft drink production—2370 million bottles of 200 ml each, worth Rs. 710 crores. Major market share (44%)—Parle Beverages & Export. (Lemon and orange flavoured drinks—56% of total; cola based beverages—35% of total.)
2. Fruit based RTS beverage production—270 million bottles and packs worth Rs. 80 crores. Major market share (68%)—Parle's Maaza, Frooti
3. Soft drink concentrate powders—Production—Rs. 32 crores. Major market share (60%)—Rasna of Pioma Industries Ltd.

The Indian beverage industry need BVO at a level of 40-60 ppm in citrus flavoured beverages. The ban caught some industries napping as they had no alternate substitute for BVO readily available that could provide the required product standards. The consumer activists were very eager to get assured that no beverage containing BVO reaches the consumer from 16.4.90 onwards.

Parle Exports introduced a locally developed sub-

stitute based on esters of mono and di-glycerides about 2 months prior to the ban. However, the colour, appearance and cloudiness of their product suffered marginally. Newer substitutes are being developed and used. They are within the ambit of PFA rules. However, the manufacturers and the end users are reluctant to declare their compositions. A number of substitutes are already being used by various soft drink manufacturers as MRTP Commission had come down with a heavy hand on the defaulters even banning a few leading soft drink brands.

The complexity of the whole issue is that while BVO is being labelled as toxic and carcinogenic by the consumer activists, the soft drink industry thinks that the ban is a debatable issue. Since (i) BVO is in use for the last 30 years without any apparent or observed hazard to humans. After exhaustive research it is permitted in developed countries like USA and Canada at a level of 15 ppm, which ensures enough safety margin. (ii) At the safe level of 0.5 mg/kg/day for a normal person of 65 kg body weight consumption of 32.5 mg BVO in a day is harmless. A drink bottle of 200 ml, would contain 3 mg BVO at 15 ppm level. Hence one can consume 11 bottles of soft drinks containing BVO daily which is much beyond the normal consumption limits. (iii) All the halogen compounds used in food industry are under a cloud and there is a move to ban not only bromine containing compounds but even fluorine in tooth paste. Even normal chlorination of drinking water leads to the formation of chloroform at a level of 80 ppb and chloroform is a known carcinogen. Indian water receives higher doses of chlorine, particularly in monsoons. Similarly iodization of salt may require reconsiderations as the effect of consumption of halogen through water and salt is not yet fully studied. (iv) Consumers are eager to know about BVO however they are confused as misinformation is floated in local press condemning all soft drinks, whether they contain BVO or not. Technically, BVO was used in citrus flavoured soft drinks and not in other beverages such as cola based ones. (v) The processed food industry in India in the organised sector has a production output much lower than the corresponding figure in the unorganised sector.

The organised sector is geared to abide by the prevailing food laws and the hygiene standards—thanks to the pressure exerted by the consumer organizations and law enforcing agencies. The product quality in the unorganised sector, however, needs improvement particularly with respect to sanitary and hygienic aspects as well as use of spurious ingredients. This is evident from the soft drinks and beverages sold near schools. It is of prime importance to ensure that the banned ingredients/chemicals/colours are not used by this sector



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**Raw Materials****266 Survey on culinary herbs**

The Geneva-based International Trade Centre sponsored survey on herbs grown in India has been completed by the Spices Board.

The survey to collect information on various types of herbs grown in different States was started in October 1989.

The survey estimated consumption of fresh culinary herbs at about 200 tonnes per year in the country. Of this, 64 tonnes are produced in the country and the rest imported, a Spices Board release said.

Nilgiris, Delhi, Srinagar and Shillong were identified as ideal for large-scale cultivation of herbs.

The Board is considering a package to assist the Tamil Nadu Horticultural Department to help small farmers procure herb seeds.

The Board will pass on information on availability of fresh herbs in the country to star hotels presently importing to meet their requirements, the release said.

(Financial Express 20 August 1990, 8)

**267 A bumper crop of biotech**

The U.S. Department of Agriculture has approved nearly 100 test plantings of crops that have been genetically altered to give them traits such as pest resistance and tolerance to weed killers.

Calgene, a biotech firm in Davis, Calif., has developed a tomato that does not rot as fast as normal varieties and hopes to market the new product by 1993. Shrimp may soon be given disease-fighting genes taken from sea urchins.

(Time International 1 October 1990, 60)



## Storage and Infestation Control

### 268 Seed extract prolongs seafood shelf life

Seed extracts from the Indian redwood tree might help prolong the shelf life of seafood by the action of chemicals that inhibit bacterial activity, scientists from the college of fisheries in Mangalore have reported.

A fraction of the crude seed extract of the tree Adenanthera pavonia inhibited bacterial activity which causes fish to rot, according to the scientists who studied the effect of the extract on fish spoilage bacteria.

Seafood spoils primarily through bacterial activity. The bacteria help produce odorous chemicals, mainly trimethylamine and other volatile sulphur-containing compounds like hydrogen sulphide.

The scientists N.M. Sachindra and Iddya Karunasagar separated the extract into three fractions through a chromatographic separation process. Reporting their findings in the Journal of Food Science and Technology, the scientists said one extract which contained organic compounds called ketones inhibited the production of hydrogen sulphide and trimethylamine by bacteria. The researchers used several species of bacteria in their tests.

The production of hydrogen sulphide by bacteria is due to the action of an enzyme on cysteine. The ketones present in the extract inhibit the enzyme, the scientists said in their report.

Prawns given a dip-treatment in this fraction had lower bacterial counts and the levels of trimethylamine and volatiles like hydrogen sulphide were lower than in the controls, they said. (P.T.I. Science Service 9(16), 1990, 1)

### 269 A new preservation technique for storing fresh chilled pork

Scientists in Australia have developed a technique for storing fresh chilled pork for 6 weeks, about twice the current storage time. The extra time will allow Australia to ship pork to Japan and South East Asia.

The technique was developed in Brisbane at the Cannon Hill Meat Research Laboratory of the CSIRO, Australia's research organization. It involves dipping pork cuts in a solution of 1.5% acetic acid held at 55 C for 10 seconds before vacuum packing. (Chemical Weekly 35(43), 1990, 97)

## 270 Alcohol sterilization curb food poisoning

A Japanese firm has developed an alcohol spraying system which effectively kills bacteria breeding on the surface on food products during packaging thereby preventing food poisoning caused by bacteria such as pathogenic colon bacillus Staphylococcus aureus and Salmonella.

Most food products are generally heat-sterilised during the production process, but later handling can sometimes expose them to bacteria.

The new alcohol based system kills that bacteria as it can be easily installed on almost any type of packaging machine. It detects products transported by conveyor using a photo sensor and sprays alcohol onto them just before packaging.

Since it uses pump pressure - not atmospheric pressure - to spray alcohol, there is no possibility that bacteria in the air will be sprayed on the products at the same time. Also, the amount of alcohol to be sprayed can be adjusted. The spray is a 75 per cent ethyl alcohol solution, which provides the best sterilizing performance.

(P.T.I. Science Service 9(7), 1990, 17)

## 271 India's first commercial food irradiation unit

India's first commercial food irradiation complex is to be commissioned in Cochin shortly. The unit will initially irradiate spices and later on it will be extended to items like prawns, fish, onions and potatoes meant for export.

The complex, jointly set up by the BARC and the Spices Board is nearing completion. Cobalt 60 is the irradiating radio isotope to be used in the complex. Food irradiation is a process by which food products are exposed to gamma rays from a radio-isotope to prevent microbial contamination, infestation by insects and sprouting. Irradiation also extends the shelf-life and allows the ripening process.

(Chemical Weekly 35(52), 1990, 92)

## 272 Food irradiation studies at BARC, Bombay

Some of the salient features of food irradiation studies done at BARC are as follows:-

Research carried out during the past two and a half decades have shown that low (0.05 - 1.0 KGy) and medium (1.0 - 10.0 KGy) doses of gamma irradiation can be used for availing specific benefits in terms of extended storage of a variety of foods. The sources available at present at Food Irradiation and Processing Laboratory for irradiation purposes are: (1) Food Package Irradiator (100,000 curies) and Gamma Chamber (4,000 curies). A moving bed onion irra-



diator with a strength of 20,000 curies is being fabricated in collaboration with the Central Workshop. In addition, a spice irradiator is being planned for fabrication.

#### Low dose applications

Low doses of gamma radiations are employed in the sprout inhibition in potatoes and onions, for delaying the ripening of fruits and in the disinfestation of grains and dried fishery products.

#### Sprout inhibition of onions and potatoes (0.05 - 0.15 KGy):

The dose response for sprout inhibition, influence of interval between harvest and irradiation, storage and transport trials on onions were studied in addition to the evaluation of flavour quality, wholesomeness and toxicological safety. Besides inhibiting sprouting, the dose selected for potatoes enabled the prevention of solanine synthesis and controlled tuber moth infestation. Since irradiated potatoes were not suitable for storage at ambient conditions because of development of microbial soft rot, storage at 10/15 C was recommended.

#### Delayed ripening of fruits (0.25 - 0.75 kGy):

Suitable procedures are evolved to extend the shelf life of mango by irradiation in combination with skin coating, kinetin dip, refrigeration or storage at modified atmosphere. The pathogens induced in mango such as from stem-end-rot, anthracnose and lateral rot have been isolated and effective combination treatments devised for the control of disease.

#### Disinfestation of wheat (0.25 - 0.75 kGy):

Optimum dose levels for the elimination of various insect pests and post irradiation storage conditions were standardized. Irradiated wheat was evaluated in terms of composition, nutritive value, germination properties and bread making abilities as well as toxicological and wholesomeness attributes employing mammalian and microbial systems. Some of these data provided basis for the international acceptance of safety of irradiated foods.

#### Medium dose applications

Moderate doses are used for the extension of shelf-life of fish and meat, elimination of pathogens from frozen seafoods and for the microbial decontamination of spices.

Preservation of seafood (1 - 5 kGy):

Three different approaches were made for the preservation of seafoods. 1) Extension of shelf-life of fresh fish in ice using radurization process (1 - 2 KGy), 2) Dehydro-irradiation process to eliminate refrigeration and freezing for storage, and 3) Utilization of less utilized fish as a source of protein as in the case of Bombay duck and doma. The radiation doses for each fish species was optimized based on the sensitivity of microflora present in the particular variety. Wholesomeness studies conducted with irradiated shrimp and mackerel ruled out any deleterious effect of irradiation.

Elimination of pathogens of frozen seafoods:

The contamination of frozen seafoods with enteric pathogens like *Salmonella* sp. and *Vibrio parahaemolyticus* is a vexing problem for the export trade. While treatment with chlorine water and ethylene oxide was ineffective, radicidation process (4 kGy) developed at BARC completely eliminated the pathogens from prepacked frozen shrimps. The irradiated samples were acceptable even after 4 months storage.

Irradiation of spices (1 - 10 kGy):

Microbial population in pepper, chilli, cardamom, cinnamon, nutmeg, turmeric and ginger were reduced following exposure to gamma radiation and a dose level less than 10 kGy was sufficient to sterilize the spices. Fungal population was eliminated even at 5 kGy. The infesting insects at all stages of metamorphosis could be effectively eradicated at dose below 1 kGy. The flavour and other quality attributes did not show measurable variations.

Clearance for Food Irradiation

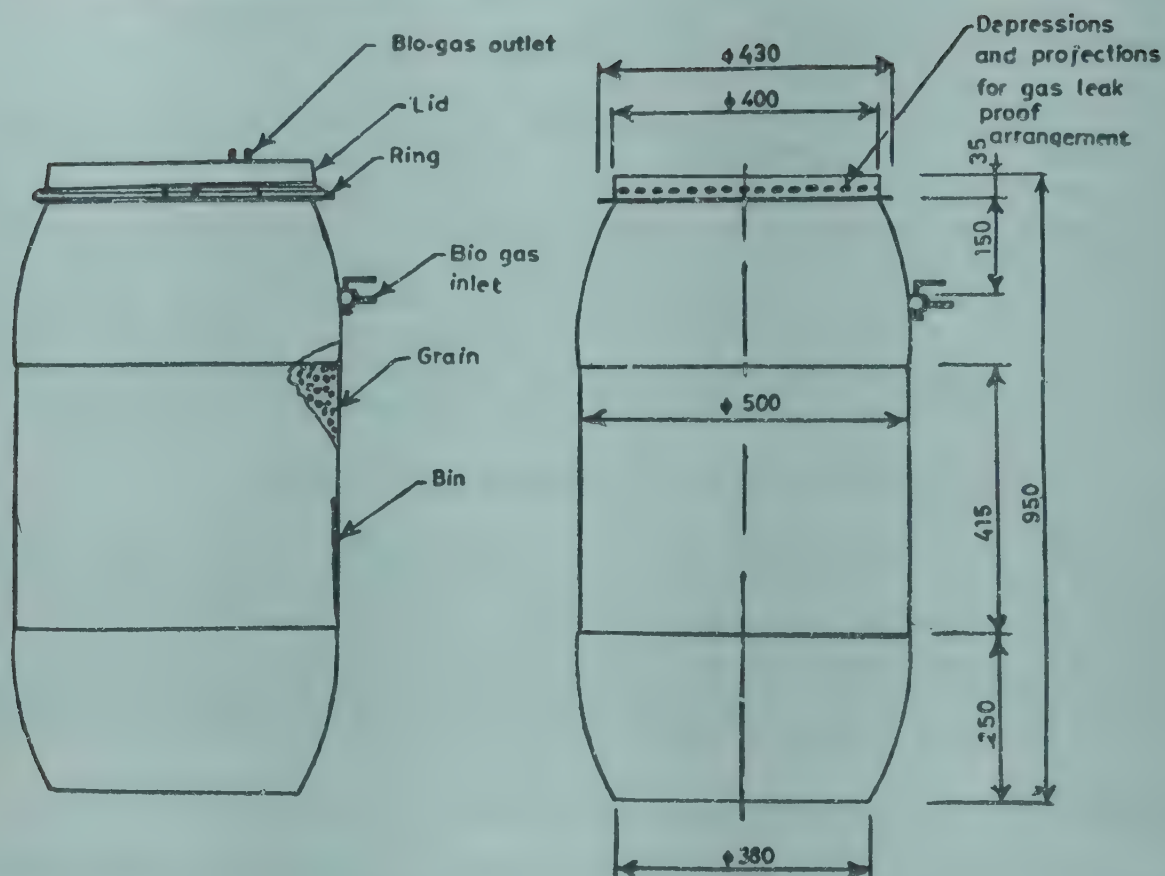
Ministry of Health and Family Welfare, Government of India, in January 1986 accorded clearance for irradiation of onions to inhibit sprouting, frozen seafoods and spices intended for export. An apex body, National Monitoring Agency (NMA), was constituted thereafter for overseeing all aspects involved in food irradiation. (Food Irradiation News 1(1), 1990, 5-7)

273 New non-insecticidal method of insect control

Post-harvest losses of food production in India amount to 10-15 percent, of which damage by insects alone accounts for about 2.5 percent. Fumigation with insecticides for control of stored grain insects, though common, has the disadvantages of the insects developing resistance and the stored food getting contaminated with residues of the harmful insecticide. Hence an attempt was made to use biogas, which consists mainly of methane and carbondioxide, for control of storage pests of paddy and sorghum.



Biogas fumigation grain storage PVC bin



### PVC bin

A special type of leak-proof PVC bin of one quintal capacity was developed for this purpose. Rectangular in shape, it has a circular mouth provided with a removal lid and ring. The lid has gasket arrangement to arrest leakage of biogas from the bin. The inlet gate valve is fitted at three-fourth height of the bin, which ensures 75 percent of space for grains and 25 percent of space for biogas.

The grain/seeds infested with the storage insect (Rice weevil, *Sitophilus oryzae*) were fumigated with biogas at the rate of 10 litres at  $1.4 \text{ kg/cm}^2$  pressure directly from a biogas plant. The biogas was maintained in the bin for periods of 7 and 10 days.

It was noticed that for 100 percent kill of the insects, the gas should be allowed to remain in the bin for 10 days. During this period, the biogas penetrates well through the pore spaces to all the layers of the grains/seeds (i.e. top, middle and bottom) bringing nearly complete disinfestation.

The germination of the fumigated paddy and sorghum seeds was not affected due to biogas. Similarly, the cooking qualities of the fumigated grain, tested after well aeration, did not show any undesirable change.

Biogas is available in most farm-steads. Further, in the present context of mammalian toxicity and residual food problems, these findings are of great significance. (Invention Intelligence July 1990, 326-327)

### Food Additives

#### 274 Supercritical fluid extraction for natural vanilla extract

Using supercritical  $\text{CO}_2$  instead of aqueous ethanol produces a higher purity vanilla extract - containing upto 36% vanillin, Vs about 20% for the alcohol extraction method. Because the process, which recovers 97% of the vanillin in the beans, is carried out at near ambient temperature, delicate flavour and fragrance of the compound are preserved.

The above breakthrough in fragrance technology was reported by Prof. Paul Barton of Pennsylvania State University (State College) at A I Ch E's Spring National Meeting in Orlando, Florida last March.

Vanilla beans are first cryoground (ground with dry ice to avoid damage due to heat generated by grinding) to about 0.2 mm. Then they may be water-soaked, and are put in an extraction vessel. Supercritical  $\text{CO}_2$  (at a pressure of about 1600 psi, temperature of 306 K and solvent concentration of 15 g.  $\text{CO}_2$ /g (dried bean) flows downward through the bed of beans for 19 hr carrying extract out with the dense gas phase.

Yield is about 0.10 g. extract/g. dried beans, compared with 0.084 - 0.093 g/g for alcohol extraction. Extract samples have been sent for testing. An economic analysis of a preliminary commercial process design was favourable and scale-up studies are planned. (Chemical Weekly 35(43), 1990, 97)

#### 275 A bioengineered food ingredient chymosin approved by FDA in USA

Pfizer Inc (New York City) is the first company to get the approval of FDA to use a genetically engineered bacterium for making a food ingredient. The product the mammalian enzyme Chymosin also known as calf rennin, which is used widely by the dairy industry as a milk-clotting agent (in cheese making), and to curdle milk into curds and whey.



Traditionally, chymosin is extracted from the stomach of a new born calves. In contrast, Pfizer has implanted the calf gene carrying the genetic code for chymosin into the K-12 strain of E-coli. This modified bacterium is then induced to express recombinant chymosin that is purer than its natural counterpart. The company has scaled up the process and is producing chymosin, under the name Chy-Max, at a new fermentation plant in Terre Hante, Indiana. Chy-Max has won approval in Australia and is undergoing review in Canada and Europe.

(Chemical Weekly 35(43), 1990, 97)

## 276 A natural ingredient developed to replace monosodium glutamate (MSG)

A natural ingredient designed to replace MSG in processed foods has been recently introduced by Fries and Fries (USA). The proprietary replacement can be used in processed meats, such as sausages, sauces for meat and vegetables, seasonings, condiments, gravies, soups and oriental foods.

It is offered in dry powder form which can be applied by mixing or marinating, depending on the product. It is stable in microwave ovens, freezing, hot fills and retort.

For further information contact: Fries and Fries, 1199, Edison Drive, Cincinnati, Ohio 45216

(Chemical Weekly 35(52), 1990, 92)

## Processes

## 277 New variety of sunflower oil

A new variety of sunflower oil has recently been developed in France, reports CEDUST.

Its composition is more conducive to diet equilibrium. It was obtained through a selection process and has been given the trade name "Oleisol". Its oleic acid content is 60-80 percent compared to 20-25 percent in traditional sunflower oils. "Harmful" saturated fatty acid content is not more than 12 percent in the new oil.

As oleisol has a high oleic acid content coupled with the near absence (1.2 percent) of another acid (n-3 linolenic acid) it is more amenable to heating. The other constituent of this oil is linolenic acid which is quite essential for nutrition.



According to the researchers who developed the oil, the idea was to create an oil, whose saturated fat content conforms to the latest medical recommendations, which strongly advocate the replacement of animal fats by vegetable ones so as to contain the risk of cardiovascular ailments.

(P.T.I. Science Service 9(13), 1990, 17)

## 278 A new indigenous process to refine crude rice bran oil

Bharat Edible Oils and Fats Ltd., Bombay, has developed a new cost-effective process to refine crude rice bran oil into an edible grade oil. The new process can refine crude rice bran containing free fatty acid (FFA) upto 69%.

The new process based on molecular distillation, has undergone pilot tests in West Germany and has been found best suited to Indian conditions, where the FFA of crude rice bran oil is going up to 69%.

The new process apart from eliminating use of hexane and alcohol, has the flexibility to refine any kind of high FFA oils into edible grade unlike the existing processes. The new process is pollution free, reduces the consumption of caustic soda by more than 80%, saves energy upto 70%, and operates at low capital costs. (Chemical Weekly 35(52), 1990, 93)

## 279 Hydrothermal treatment to boost soybean oil yields

The yield of soybean oil can be raised by subjecting them to a special hydrothermal treatment, studies at the Central Institute of Agricultural Engineering in Bhopal have shown.

The studies indicate that boiling soybean splits with water for 30 minutes and then sundrying them to get a 7 per cent moisture content gives a maximum oil recovery of some 82 per cent, scientists J Singh and P.C. Bhargale said reporting their work in the Journal of Food Science and Technology.

Although solvent extraction methods are efficient, they do not suit the small scale rural or urban processing centres because they are capital intensive and volume intensive. Moreover some 90 per cent of the total oilseeds are currently being pressed through mechanical screw expellers.

Last year scientists at the CIAE reported that soy splits treated with water sprinkling and conditioned to some 17 per cent moisture yielded 62 per cent oil with minimum specific energy consumption in four to five passes by mechanical processing.

The current studies were designed to improve the oil recovery by subjecting the soybean to various hydrothermal treatments before mechanical screw expression, according to the scientists.

In the process, the soybean is converted into splits free of hulls by a dehuller and the splits are boiled in water for 30 minutes



and later sundried. This has led to a significantly high oil recovery of over 82 per cent, they said.

The residue cake was also of good quality because its antinutritional factors like trypsin inhibitors are inactivated. It is also good in appearance and flavour, the scientists said.  
(P.T.I. Science Service 9(16), 1990, 1)

## 280 Cryogenic grinding of cardamom

Scientists at the Regional Research Laboratory (RRL), Trivandrum, have carried out experiments on very low temperature grinding or cryogrinding of cardamom seeds which improves the quality of cardamom powder by preventing the loss of highly volatile flavour constituents.

If cardamom seeds were ground in an ordinary grinding mill, a temperature of 42 to 95 degree celsius is attained, resulting in considerable (26 to 52 per cent) loss of the volatile oil that gives cardamom its characteristic aroma.

In Indian kitchens cardamom is generally ground for direct use immediately before mixing so that the volatile oil released in the process imparts its aroma to the food. But if the cardamom is used in the form of ready-made powders, the aroma is lost.

Cryogrinding is a practical way to achieve a finely ground product without any loss of flavour. The process, apart from improving the product, is also reported to prevent oxidation and volatilisation of the essential oil, increase the dispersibility of the product, avoid the formation of 'specks' when added to food, and reduce sedimentation in liquid foods and the microbial count. The net result is that the original flavour and quality are retained to a greater extent.

(Deccan Herald 11 October 1990, VI)

## 281 Wheatless bread

In response to the growing dependence of Third World communities on overseas sources of grain, and the erosion of subsistence agriculture, FAO has been investigating the possibility of making breads from sorghum, cassava and other local starchy foodstuffs.

After about two years of research and development, FAO has come up with recipes for bread which can be made commercially or at home from such tropical staples as rice, millet, maize or sorghum, and from various roots and tubers. The taste and texture of the new products have been well received in the market tests, and their shelf-life has been equal to, or better than, that for bread from wheat.

The recipe given will serve for all types of wheatless bread. The paste is prepared by mixing 400 g of cassava or rice starch in 2200 ml of water, and boiling until translucent followed by cooling.



Batter is prepared by adding to the above mix 2000 g of flour (either rice, maize or cassava), 100 g of sugar, 40 g salt, 40 ml edible oil and mixing. To the above mix is added 25 g of fresh yeast, in 160 ml of water containing 5 g sugar. It is mixed for 5 minutes and batter is poured into baking tin and allowed to rise. Baking is done at 210 C for 35 - 45 min. Users only have to choose the flour most common to their region. This recipe may be divided into five equal portions to produce five loaves. Once baked and cooled, these loaves can be frozen.

For details, contact: Food and Agricultural Industries Service, FAO, Via delle Terme di Caracalla 00100 Rome, Italy.  
(Asia-Pacific Tech Monitor May-June 1990, 24)

## 282 Simple process for iodising salt

The Bhavnagar-based Central Salt and Marine Chemical Research Institute has developed a simple economically viable process for iodising common salt by the "Submersion process".

After experimenting with several iodine compounds, it has been found that potassium iodate is best suited for iodisation of salt because of its relative stability even in tropical climates. It has been reported that under adverse conditions of moisture, heat and sunlight the iodine content of salt iodised with potassium iodate remains relatively stable compared to potassium iodide which decomposes and imparts yellow colour to salt with substantial loss of iodine. An expert group has said there is no danger of toxic effects if iodates are substituted for iodides in salt iodisation.

In the manual submersion process, salt with 96 per cent sodium chloride content is spread out in submersion tank to make a layer of height 24 to 30 cm. The salt is then submerged in saturated salt solution in which predetermined quantity of potassium iodate is dissolved. The exact quantities of iodating agent to be added depends on the chemical as well as physical property of the salt.

The submerged salt is raked manually for a few minutes and excess brine is discharged to the settling tank. The wet salt is collected and heaped in the tank where it is allowed to drain for about eight hours. The drained liquor is also collected in the same settling tank. The settled brine is pumped back to the storage tank and recycled. The heap after draining is spread on the same platform for solar drying for about 18 hours. The final product contains 30-35 ppm of iodine.

Mechanised submersion process is used for largescale continuous production. The plant consists of belt conveyor, screw conveyor, centrifugal pumps and a grinder of suitable size. Cement tanks and platforms are also constructed. The raw salt is graded and fed to the hopper of counter current screw conveyor. The saturated iodated brine is continuously fed to the base of screw conveyor on salt.

The wet iodated salt containing about 20 per cent brine is dragged by the screw conveyor to the discharge end where it is drop-



ped on continuously moving belt-conveyor which conveys it to the draining platform. The salt is allowed to drain for 6-8 hours and spread for solar drying for 16-18 hours.

Some of the advantages of the submersion process are: (a) It is extremely simple and is suitable for both small and large scale production, (b) Electric power requirement is comparatively low, (c) The process is applicable to any variety of salt like Kurkutch, Badagara etc, (d) The complete mass of salt is submerged in a weak solution of iodating agent, so uniformity of distribution of iodine is well maintained, (e) Once the quality of salt to be iodated is known, single point control is sufficient for quality control (f) To a certain extent, superficial magnesium impurity of the salt crystals can be removed by controlling the magnesium content of the process solution. This helps in increasing the purity of the final product which also increases the stability, and (g) The salt crystals can be ground after iodization without loss of iodine.  
(P.T.I. Science Service 9(14), 1990, 3)

### 283 Coconut water as bottled soft drink

The Phillippines, a leading exporter of copra, has developed a technology to make available coconut water as bottled soft drink. Once pasteurized, the clear sweet liquid is carbonated with food grade carbon dioxide, then aseptically packed and sealed in containers, giving the drink a long shelf-life. A modified process is used to produce a non-carbonated version. The National Institute of Science and Technology, which developed the technique, reports that the beverage retains its natural flavours and contains more nutrients than other soft drinks. Coconut water is a reliable source of potassium for cardiac patients.  
(Chemical Weekly 35(43), 1990, 97)

### 284 Soyabean gaining popularity

The Central Institute of Agricultural Engineering in Bhopal has developed a simple process to remove the undesirable effect of soybean. The process consists of de-hulling, soaking the soy-splits in water, boiling in water for about 15 minutes and drying of cooked splits before they are ground into flour.

The soy flour thus obtained would contain 40 per cent protein and 20 per cent oil. The process also enhances the water absorption capacity of the flour to 200 per cent, as a result of which the dishes made out of it such as chappatis, are softer and easily digestible.

Further, the process takes care of all the anti-nutritional effects including the repulsive beany flavour.

At present, India produces about 1.5 million tonnes of soyabeans from 2.1 million hectares of crop area.



Soya foods like soy flour, soy fortified biscuits, soy flakes and soy badi can be very good supplement to the cereal based Indian diets which are generally deficient in proteins and calories. (Financial Express 4 October 1990, 10)

## 285 A new synthetic fat substitute

DDM - dialkyl dihexadecymalonate - a fatty alcohol ester of malonic acid and alkylmalonic acids, is being developed as a fat substitute for high temperature applications by Fritto-Lay Inc., 900 North Loop 12, Irving TX 75061 USA.

DDM has been used to produce potato and tortilla chips. Sensory panels, conducted for around one year, show that a blend of DDM and soybean oil used as a frying medium results in potato and tortilla chips that panelists report are equally as crisp as those fried in standard vegetable oils. Panelists also report that finished products made with DDM are less oily than those fried in regular vegetable oils.

The DDM soybean oil blend results in a 33% reduction in calories and a 60% reduction in fat. Feeding studies with rats show that the synthetic fat substitute is minimally digested and that less than 0.1% is absorbed. Testing continues with the synthetic frying oil, while other non-nutritive DDM products are being evaluated in mayonnaise and margarine type products. (Chemical Weekly 35(52), 1990, 92)

## Byproducts and Waste Utilization

### 286 Sugar from jute sticks

A process making jute stick a potential source for sugar production has been developed at the Jute Technological Research Laboratories in Calcutta.

Optimising various parameters like acid strength, solid-liquid ratio, temperature and time, the process uses concentrated sulphuric acid as hydrolysing agent. The yield of reducing sugars from untreated jute stick is 59.8 per cent and from delignified jute stick is 64.7 per cent comparatively favourable with that obtained from hardwoods.

Chemically, jute stick is composed of heterogenous polymer of alpha-cellulose, hemicellulose and lignin. The holocellulose com-



prising the cellulose portions can be converted into sugars by acidic or enzymatic hydrolysis.

The jute stick was crushed into 40-60 mesh size and extracted with alcohol-benzene (1:2) for 10 hours. The defatted jute stick was subjected to acidic hydrolysis.

Primary hydrolysis was carried out by soaking jute stick powder in concentrated sulphuric acid in various concentrations for different periods and temperatures. In primary hydrolysis, the cellulose moiety is hydrolysed to oligosaccharides. In secondary hydrolysis the acid is diluted to 40 times its volume with water to hydrolyse oligosaccharides into monosaccharides.

The residue weight which contains mainly lignin and ash is more or less same in all soaking periods at 40 degrees celsius and above. But at 20 degrees celsius the residue weight decreases with increasing soaking time and the yield of sugars increases with increasing soaking period. This might be due to the fact that at low temperature the breaking of lignin-carbohydrate bond takes much longer time. However, the increase in solid-liquid ratio at lower temperature does not have much effect on yield. But at 40 degrees celsius and above the increase in solid-liquid ratio results in a decrease in the yield which might be due to decomposition of resultant sugars.

The maximum amount of glucose and xylose under optimum conditions is found to be 41.4 per cent and 16.9 per cent respectively from untreated jute stick.

(P.T.I. Science Service 9(14), 1990, 4)

## 287 Energy from sugarcane waste

The Uttar Pradesh Government has launched a programme for producing alternate source of energy from sugarcane waste in sugar mills.

Co-operative sugar mills have taken keen interest in implementing the scheme, an official spokesman said here on Friday.

An energy producing plant is being installed with the Sheh Road Sugar Mill in Bijnor.

The mill will produce six mw electricity from the sugarcane waste of the mill.  
(Financial Express 22 September 1990, 12)

## Equipment and Machinery

### 288 Portable mixers

W P Engineering Works designs and manufactures a wide range of Portable Mixers to help reduce the operation time and power consumption and increase efficiency in mixing, gas absorption, blending, homogenization, heat transfer, solid suspension, dispersion, wet grinding, mass transfer, dissolving, extraction, emulsification, etc. in chemical, petrochemical, dyes and colours and allied industries. These mixers are rigid in construction and easy to operate. The range includes single shaft mixers with propeller, turbine, paddle and anchor type blades. Special purpose mixers are offered on request. The mixers can be supplied in material of construction such as mild steel, stainless steel and nickel, flange mounted with or without stuffing box with dual speed.

For further information write to: W P Engineering Works, 18/19, Ashirwad Indl Est No 3, Ram Mandir Road, Goregaon (W), Bombay 400 104.

(Industrial Products Finder 18(10), 1990, 37)

### 289 Pouch sealing machine

Sealers India manufactures various types of Pouch Sealing Machines. These machines are used for sealing pouches filled with food or other products. They operate on a low voltage pulse heating, controlled by an electronic timer. The mouth of the filled pouch is inserted between the heating jaws and is pressed, and within a few seconds, the bag is sealed neatly. The machines come with impulse as well as continuous sealing system suitable for virgin as well as laminated pouches. Various models are available: hand operated, light duty; hand operated, heavy duty; foot operated; foot operated with horizontal jaw movement; pneumatically operated; and automatic rotary type pouch sealing machine.

For further information write to: Sealers India, No. 10, Kubera Ganapathy Street, Mathiayalagan Nagar, Padi, Madras 600 050.  
(Industrial Products Finder 18(10), 1990, 138)

### 290 Automatic tube filling and sealing/closing machines

Frigmaires Engineers offers automatic tube filling and sealing/closing machines manufactured by Unipac Srl, Italy, for use in chemical, cosmetics, pharmaceutical and food industries. These machines have been constructed following recognised standards and have been designed by considering the highest standards dictated by international rules for the food and pharmaceutical industries. The advanced design features external machine parts in stainless steel or



non-toxic nickel for easy machine cleaning and resistance to wear and pollutants. Sealing/Closing systems are available for metal, plastics, polyfoil and laminate tubes. Models are available for all production requirements. Output varies from 1,000 to 12,000 pieces per hour depending on the model.

For further information write to: Frigmaires Engineers, 2nd floor, Bharat House, 104 Bombay Samachar Marg, Bombay 400 001. (Industrial Products Finder 18(11), 1990, 24)

## 291 Rotary powder filling machines

Autopack England offers semi-automatic and automatic rotary powder filling machines having filling speeds of 25 to 100 fills/minute. These machines can handle powder products like milk powder, salts, spices, and other free flowing and non-free flowing powder products. Autopack also offers semi-automatic and automatic liquid filling lines from 100 cc to 200 litres; and multi head selective weigher for frozen foods, vegetables, confectionary, dry foods, snacks, nuts, biscuits, etc. Product is filled by weight with the help of microprocessor based control systems. Linear weighing machines are also offered with vibratory feeders.

For more details write to: Panpack Marketing, Panchal House, P.B. No.48, Station Road, Anand, Gujarat 388 001. (Chemical Products Finder 9(2), 1990, 70)

## 292 Biscuit wrapping machine

The MOI BRISK-Biscuit Wrapping machine wraps square and rectangular biscuits into packets of 50 to 100 grams at speeds up to 85 packets per minute. The machine does a single or double wrap of wax coated paper for both inner and outer wraps. Biscuits are fed into a continuous running in-feed conveyor which aligns and pushes them into the single station box along with the inner and outer wax coated paper sheets (fed through the print registration and cutting units). The packet formation is done in the box and the packet is pushed out by conveyor mounting pushers into the top-heating unit. At this stage, the top flap formation and longitudinal sealing are done. The packet is then pushed into the top cooling jacket to firm up the longitudinal seal. The pack is pushed through the side folding and heating units to the side cooling jackets for completion of end sealing and ejected at the end of the pusher mounted conveyor. Standard features are: automatic print registration device to control position of print on the packet; no product, no wrap interlock to prevent paper wastage; digital temperature controllers to minimise variation in heater temperature for even wrapping quality; and automatic counting and feeding system to push the required number of biscuits into the infeed conveyor.

For further information write to: MOI Engineering Ltd., A-7 Industrial Estate, Mohali, Punjab 160 051. (Industrial Products Finder 18(10), 1990, 31)



## 293 Mango peeler-slicer

An advanced mango peeler-slicer has been invented at the Queensland Department of Primary Industries agricultural engineering section. Explaining how this invention works, DPI engineer Tom Franklin, Redlands Horticultural Research Station, Brisbane, states: The machine produces peeled and sliced pieces from mango cheeks, which have been cut from whole fruit. Mango cheeks are placed on a belt with the cut surface down and are continuously conveyed into the machine. Very little flesh is left on the skin and all surfaces of the slices are cut, so that their appearance is excellent.

Mr. Franklin points out that "production rates averaged around 400 kg of slices an hour, corresponding to fruit input of 1.2 tonnes an hour". Gordon Young, QDPI engineer believes that the machine will assist in the development of a major mango processing industry. He adds that processed products can be stored for year round use and exported without the quarantine restrictions which inhibit fresh fruit exports.

(ASEAN Food Handling Newsletter No.35, 1990, 4)

## 294 Quick cleaning pump for the food industry

The Series NL pumps from Netzsch Mohnopumpen GmbH, West Germany, are designed for use in food industry. They can also be used where media are pumped in batches which must not be mixed, eg, paints. These pumps are quick to dismantle and arranged for perfect cleaning. There are no inaccessible places in the conveying space and no hollow shaft. Made from polished or superfinished Cr-Ni-Mo steel, these pumps are available for outputs upto 40 m<sup>3</sup>/hr, and pressure heads upto 24 bar.

For more details write to: Techman Tara Universal, 308 TTK Road, Madras 600 014.

(Chemical Products Finder 9(3), 1990, 91)

## 295 Double-cone vacuum driers

Mech-Tech manufactures Double-cone vacuum driers for fast and efficient drying of a wide range of chemical, pharmaceutical and food products. The double-conical vessel with an external jacket for heating ensures direct contact between the material and heated surface. The vessel rotates on its axis resulting in tumbling action of the product inside. This constant movement of the product increases the heat transfer between the heated surface and the product. A high vacuum is maintained throughout the drying process to facilitate full recovery of solvent vapours. Salient features are: uniform temperature throughout the batch eliminates caking; totally sealed and protected from dust and contamination; quick loading and unloading; and low temperature drying retains product characteristics. The driers are available in capacities ranging from 250 to 2,500 litres.



For more details write to: Mech-Tech, P.B. No. 9019, SCB Complex, WE Highway, Goregaon (E), Bombay 400 063.  
(Chemical Products Finder 9(1), 1990, 121)

296 Dryers for dehydration of grapes and other food products

Gayatri Industrial Engineers has developed dryers for dehydration of grapes and other food products. The dryer consists of hot air circulation fans, a heating system with steam/electric/oil heaters, an exhaust arrangement and a glass-wool insulated oven. The air flow system gives uniform temperature throughout the drying zone. Designed to give high efficiency drying with minimum losses, the dryer replaces conventional sun drying process by greatly reducing the time for dehydration.

For further information write to: Gayatri Industrial Engineers, A3/002 Govardhan Nagar, LBS Marg, Mulund (W), Bombay 400 080.  
(Industrial Products Finder 18(10), 1990, 231)

297 Electric rice cooker

INDO Matsushita Appliances Company Ltd., launched the National Nippo Electric Rice Cooker on May 9, 1990. The company is a joint venture with Matsushita Electric Industrial Company (National) of Japan, the world's largest manufacturer of electrical appliances. The electric rice cooker has a special thermostat invented and patented worldwide by Matsushita which switches automatically to a Keep Warm mode when the rice is done. The cooked rice is then kept hot and ready to serve for up to four hours. The cooker has a thermal fuse for extra safety and the appliance can be opened even whilst cooking. Product tests carried out in December 1989 in Bombay and Madras have met with an overwhelming response and validates market research that revealed a latent demand for this product. The company manufactures the cookers at Cholavaram village in the industrially backward area of Ponneri taluka where Japanese engineers from Matsushita supervise manufacturing activities.

Further information can be had from: Indo Matsushita Appliances Co Ltd., Jhaver Plaza, 2nd floor, 1-A, Nungambakkam High Road, Madras 600 034.  
(Industrial Products Finder 18(10), 1990, 87)

298 Convenient electric ice cream maker

Richmond Cedar Works Manufacturing Corporation, USA, has recently introduced a convenient electric ice cream maker. The 5 Quart Frost King Electric Freezer makes 1.89-4.73 litres of ice cream or frozen desserts in 20 - 30 minutes without any cranking. This compact, easy to use freezer, made of real wood and brassed hoops, features a powerful motor with automatic reset and a high impact housing that will not rust, chip or peel. The easy to clean unit comes in 120 V, 60 cycles or 220/240 V, 50/60 cycles.

For further information write to: Richmond Cedar Works Manufacturing Corporation, 400 Bridge St, Danville, VA 24541, U.S.A.  
(Industrial Products finder 18(9), 1990, 173)

### Packaging

#### 299 Biodegradable plastic

Heinz of the US has come out with a new plastic ketchup bottle specifically designed for the recycling market. The new plastic bottle contains 98.5% polyethylene terephthalate (PET). The remaining 1.5% is an oxygen-barrier material, which makes it safe for highly-sensitive foods like tomato products. Heinz hopes the bottle will be as useful to recycling mills as pure PET. The bottles are expected to hit the market some time next year.  
(Chemical Weekly 35(49), 1990, 116)

### Commercial Intelligence

#### Production (Raw Materials)

#### 300 All India final estimate of oilseeds crops: 1988-89

Crop	Area (Thousand Hectares)	Production (Thousand Tonnes)
Groundnut	8430.3	9543.7
Castorseed	635.1	416.5
Sesamum	2432.5	666.6
Rapeseed and mustard	4865.0	4412.2
Linseed	1181.6	349.4
Nigerseed	606.9	173.2
Safflower	781.9	429.1
Sunflower	1052.3	396.8
Soyabean	1654.7	1500.8

(The Oils and Oilseeds Journal 43(1), 1990, 10)



## 301 Production estimate of spices 1987-88 (Final)

(Production in tonnes)

State	Black Pepper	Chillies	Ginger	Turmeric	Cardamom	Coriander	Garlic
Andhra Pradesh	-	2,61,400	8,570	1,15,200	-	28,200	1,306
Arunachal Pradesh	-	1,004	3,816	500	-	-	-
Assam	-	6,672	-	5,559	-	-	-
Bihar	-	3,511	1,177	5,565	-	3,638	6,477
Gujarat	-	7,100	340	-	-	-	4,700
Haryana	-	4,800	64	-	-	239	23,780
Himachal Pradesh	-	193	303	-	-	-	-
Jammu and Kashmir	-	439	-	-	-	-	100
Karnataka	704	37,403	3,484	18,445	1,549	1,717	2,078
Kerala	48,275	975	42,976	6,161	2,826	-	-
Madhya Pradesh	-	10,719	3,436	357	-	17,795	1,23,387
Maharashtra	-	71,100	589	7,161	-	-	30,500
Manipur	-	3,700	600	-	-	-	-
Meghalaya	-	1,100	30,100	1,800	-	-	-
Mizoram	-	3,300	4,500	-	-	-	-
Nagaland	-	180	70	-	-	-	-
Orissa	-	58,130	7,770	28,918	-	8,300	120
Punjab	-	5,200	-	-	-	-	54,900
Rajasthan	-	20,696	560	192	-	1,66,603	11,002
Sikkim	-	-	12,600	-	4,000	-	19,218
Tamil Nadu	240	23,946	810	91,727	533	13,370	4,932
Tripura	-	700	1,189	1,898	-	-	-
Uttar Pradesh	-	16,002	5,260	514	-	3,065	19,254
West Bengal	-	30,697	7,460	10,700	842	-	-
Delhi	-	26	-	-	-	-	-
Pondicherry	7	47	-	-	-	-	-

(Agricultural Situation in India April 1990, 62-84)

## 302 Production estimate of coconut and banana, 1987-88 (Final)

State	Coconut*	Banana**
Andhra Pradesh	4,80,046	2,70,000
Arunachal Pradesh	-	5,421
Assam	79,850	4,11,728
Bihar	-	67,482
Goa	1,06,900	-
Gujarat	-	5,12,891
Karnataka	10,91,856	95,030
Kerala	36,69,516	3,61,834
Madhya Pradesh	-	3,03,656
Maharashtra	88,949	13,34,700
Manipur	-	36,210
Meghalaya	-	57,900
Mizoram	-	7,784
Orissa	1,13,660	1,93,220
Tamil Nadu	15,78,300	10,55,277
Tripura	3,342	22,000
Uttar Pradesh	-	13,635
West Bengal	2,48,533	-
Andaman & Nicobar Islands	79,972	17,764
Lakshadweep	24,800	2,700
Pondicherry	22,685	3,233

\* Production in '000 nuts

\*\* Production in tonnes

(Agricultural Situation in India April 1990, 54-56, 59-61)



## 303 Production estimate of tuber crops, 1987-88 (Final)

(Production in tonnes)

State	Potato	Sweet potato	Onion
Andhra Pradesh	6,807	21,700	1,62,500
Arunachal Pradesh	20,700	1,400	-
Assam	3,28,797	27,363	10,660
Bihar	15,32,510	2,93,102	1,34,467
Gujarat	1,97,900	13,332	2,16,200
Haryana	1,54,500	7,236	51,018
Himachal Pradesh	24,952	-	877
Jammu and Kashmir	5,984	-	319
Karnataka	1,94,946	43,999	2,12,040
Kerala	-	33,851	1,625
Madhya Pradesh	3,26,921	39,194	1,96,341
Maharashtra	59,757	78,400	6,30,000
Manipur	20,900	300	-
Meghalaya	1,45,400	13,000	-
Mizoram	982	2,211	-
Nagaland	2,500	600	380
Orissa	78,740	3,51,270	3,19,000
Punjab	5,40,900	673	5,200
Rajasthan	17,132	2,120	75,359
Sikkim	26,400	-	-
Tamil Nadu	1,84,020	42,530	1,63,932
Tripura	46,810	13,533	230
Uttar Pradesh	64,19,368	2,67,410	5,00,596
West Bengal	37,87,016	-	-
Andaman & Nicobar Islands	-	800	-
Delhi	1,343	100	1,890
Pondicherry	-	175	120

(Agricultural Situation in India April 1990, 75-87)

## 304 Sharp hike in fruit and vegetable production

There has been a substantial hike in the export of fruits and vegetables from a paltry level of Rs. 219 million in 1980 to Rs. 794.8 million in 1989.

Similarly, the production of fruit and vegetable in the country has registered a five-fold increase in the last 20 years from 52,274 tonnes in 1970 to 240,000 tonnes in 1989. The number of licences to fruit and vegetable processing units has increased to 3629 this year as against only 1094 in 1970.

This was disclosed by the Union Food Processing Industries Minister, Mr. Sharad Yadav, while addressing the meeting of the Consultative Committee attached to his Ministry, in New Delhi.

According to the Minister, the present level of annual production of fruits and vegetables in the country is estimated to be of



the order of 70 million tonnes. Out of this, fruit contributes about 33.6 per cent. While fruits and vegetables are mainly in fresh form, only a very small percentage is processed at present.

The present installed capacity of the fruit and vegetable processing industry is estimated at 708,000 tonnes. Even this capacity is not fully utilised and actual utilisation is only around 34 per cent. Besides, fruits and vegetables worth million of rupees are wasted every year.

The Minister said that the industry is largely dependent on exports and this too was limited to a very few markets. Unless the very narrow base of the domestic demand for fruits and vegetables products is broadened, the industry cannot grow and even its export performance is bound to be handicapped.

The fruit and vegetable processing industry has attributed the high prices of its products to the high incidence of taxation and cost of packaging. The incentives provided by the Government to the industry in recent times include a reduction in excise duty on fruit-based drinks and certain spray drying equipment from 15 per cent to 10 per cent. Excise duty on pickles and on kraft paper and kraft paper board used for fruit pack has been abolished. The excise duty on coffee has been reduced to a negligible Rs. 2.50 per quintal from Rs. 78 to Rs. 105 per quintal. The import duty on prawn feed, fish lever oils, stainless steel items for manufacture of machinery, specified machinery/equipment for food processing/marine products and heat recovery system has also been reduced.

The Minister said, to enable the large houses to enter the food processing sector, all the food processing industries except milk-foods, malted foods and flavour have been placed in Appendix I, subject to the reservation for small-scale industries. All packaging industries for food processing, excluding the items reserved for the small sector, have been placed in Appendix I. Similarly, the scheduled industries under Schedule 27(5) and 27(1) of the Industries (Development and Regulation) Act have been broad-banded except those reserved for the small sector.

He said the requirement of the industrial licence under the Industries Act has been dispensed with in order to encourage the growth of fruit and vegetable processing industries.

Referring to the working of the Public Sector Undertakings under the Ministry, the Minister said that the North Eastern Regional Agricultural Marketing Corporation (NERAMAC), set up to foster the growth of horticulture-based industry in the north-eastern region is setting up a pineapple juice concentrate plant at Silchar to process 5,400 tonnes of pineapple annually. It has already set up a fruit-processing unit at Bhagalpur in Bihar with a capacity to produce 1,386 tonnes of mango pulp, 1,320 tonnes of mango juice, 1,440 tonnes of guava juice and 504 tonnes of guava pulp. It is also operating a fruit-based drink bottling unit at Delhi.

Mr. Chandra said that nodal agencies have been set up in almost all the States, for coordinating the activities of food processing



industries. The Ministry has provided Rs. five million as assistance to states to strengthen these nodal agencies.  
(Economic and Commercial News 20(37), 1990, 7-8)

### Production (Industrial)

#### 305 Indian sugar production

Statement showing number of factories in operation and sugar produced during the seasons 1986-87, 1987-88 and 1988-89 (upto 31.12.1989)

Sl. No.	State/Region	1986-87		1987-88		1988-89	
		No. of Fys. in Operation	Sugar* Produced	No. of Fys. in Operation	Sugar* Produced	No. of Fys. in Operation	Sugar* Produced
1.	Assam	2	5	2	10	2	9
2.	Andhra Pradesh	31	529	31	544	30	507
3.	Bihar	26	299	27	312	27	319
4.	Goa	1	8	1	9	1	9
5.	Gujarat	12	576	11	578	11	578
6.	Haryana	8	289	8	272	8	280
7.	Karnataka	24	612	25	745	26	703
8.	Kerala	2	10	2	7	2	14
9.	Madhya Pradesh	8	71	8	85	8	63
10.	Maharashtra	91	2388	90	2795	95	2629
11.	Nagaland	1	4	1	6	1	5
12.	Orissa	3	21	3	28	5	17
13.	Punjab	11	234	13	210	13	245
14.	Pondicherry	2	59	2	50	2	54
15.	Rajasthan	3	22	2	6	3	14
16.	Tamil Nadu	25	814	25	784	27	1004
17.	East Uttar Pradesh	41	617	41	656	41	620
18.	West Uttar Pradesh	23	823	23	837	23	710
19.	Central U.P.	38	1117	40	1173	39	971
20.	West Bengal	2	4	2	3	1	2
All-India		354	8502	357	9110	365	8753

\*(in 000 tonnes)

(The Sugar Technologists Association of India, 52nd Annual Convention Souvenir, 1990)

## 306 Rice bran oil production

The production of rice bran oil in the country during the last three years has steadily increased to over 316,000 tonnes in 1988-89 as compared to over 290,000 tonnes in 1987-88 and 279,000 tonnes in 1986-87.

It is possible to achieve an additional production of rice bran oil to the extent of 120,000 to 150,000 tonnes, if rice production is integrated with separation of bran in the rice mill and that is used for extraction of oil.

Some of the steps taken to promote rice bran oil in the country include fiscal incentives at the rate of Rs. 5,000 per tonne of rice bran oil used in manufacture of vanaspati has been allowed; fiscal incentives at the rate of Rs. 640 per tonne of rice bran oil used in soap manufacture has been allowed; the Department of Civil Supplies has undertaken a programme of modification of huller rice mills through State Government and through CSIR in which direct assistance of Rs. 5,000 per huller mill is provided and the concessional rate of custom duty has been allowed on import of stabilisers. (Economic and Commercial News 20(27), 1990, 11-12)

## 307 De-oiled rice bran (rice bran extraction) - Rice Bran Processing, Production and Export during fiscal year 1987-88 and 1989-90 (EST)

Year	Rice Bran Oil Produced				Deoiled Rice Bran Exports	
	Rice Bran Processed M. T.	Edible M. T.	Industrial M. T.	Quantity M. T.	Unit Value per M. T. Rs.	Deoiled Rice Bran used locally (Estimated) M. T.
1987-88	1940500	118650	159400	352750	794	1297000
1988-89	2092250	124650	175500	396450	925	1375000
1989-90	2250000	135000	195000	550000	1000	1370000

(The Oils and Oilseeds Journal 42(7-9), 1990, 28)



## 308 Minor edible oilseeds collection and production

Commodity	Minor Oilseed Collection & Processing 1989-90 M.T.	Production of oil 1989-90 M.T.	Minor Oilseed Collection & Processing by 1994-95 M.T.	Production of oil by 1994-95 M.T.
Salseed	*1,80,000	23,400	3,00,000	39,000
Mango Kernel	15,000	1,350	75,000	6,750
Mahua	70,000	28,000	1,00,000	40,000

(\* Bihar - 20,000, M.P. - 55,000, Orissa - 95,000, U.P. - 8,000 and West Bengal - 2,000 = 1,80,000)

(The Oils and Oilseeds Journal 42(7-9), 1990, 31)

## Export

## 309 Milk powder export under OGL

The Government has allowed export of milk powder (skimmed or full cream) whole and infant milk food by the National Dairy Development Board (NDDB) under open general licence.

Public notices making these amendments in the export policy were issued by the Chief Controller of Imports and Exports on August 10. (Economic and Commercial News 20(35), 1990, 9)

## 310 NDDB to export milk powder to Australia

The National Dairy Development Board (NDDB), has concluded an agreement with Agrifoods Marketing International Pvt Ltd of Melbourne, for exporting 15,000 tonnes of skimmed milk powder.

The contract was signed at Anand by Dr. Amrita Patel, Managing Director of NDDB, and Mr. G.J. Mc-Hugh, Director of Agrifoods Marketing International Pvt. Ltd. This is for the first time that India will be commercially exporting milk powder to any country.

According to the terms of the agreement, the initial consignment will be of 3,000 tonnes. After clearance from Agrifoods for quality another 7,000 tonnes would be despatched. An additional 5,000 tonnes will be shipped not later than March 1991 subject to mutual agreement of both parties in regard to price and successful completion of the earlier consignments.

Now, apart from Australia, countries like Nepal, Bangladesh, UAE and organisations like the International League of Red Cross have evinced keen interest in buying Indian milk powder. The World Food Programme is also interested. There is even commitment for export to EEC countries.

(Financial Express 27 September 1990, 2)

### 311 Air freight subsidy on export of cardamom

The Centre has decided to give air freight subsidy at the rate of Rs. 7.25 per kg on exports of cardamom (small) in consumer packs of two kg and less to the Gulf and West Asian markets.

This will be applicable to exports effective from Friday and up to January next, a Spices Board press release said.

The payment of subsidy will be made by the board on getting the relevant documents. The scheme will stop once 300 tonnes exports by air have been achieved, or the price begins to rise indicating shortage in West Asian and Saudi markets, the release said.

(Financial Express 16 September 1990, 10)

### 312 Growth in marine products export

India exported 110,788 tonnes of marine products valued at Rs. 634.76 crores during 1989-90 registering a growth of 11.04 per cent in quantity and 6.17 per cent in value over the previous year's export.

However, the unit value declined to Rs. 57.29 from last year's Rs. 59.92 mainly due to price decline for shrimp in the international market, according to the Marine Products Export Development Authority (MPEDA) here.

While Japan remained the single largest market for Indian marine products, the share of Japan registered a marginal decline during 1989-90.

Exports to the United States and European Economic Community registered growth both in terms of volume and value.

As usual shrimp dominated and accounted for 52 per cent of the volume and 73 per cent of the value.

Lobstertails, frozen cuttlefish, fresh and frozen fish were the other items which registered a growth rate in export during the year under review.

India also exported dried fish, shark fins, fish maws, live crabs, aquarium fish, fish pickles, seafans, seadragon, frozen octopus and frozen boiled clams.

(Financial Express 4 September 1990, 10)



## 313 Basmati rice export

The Association of Basmati Traders of America has called for a major effort to introduce the high quality basmati rice to the non-ethnic American consumer.

The association has also suggested formation of an all-India rice board on the lines of Tea Board to tap enormous potential in the US.

The association favours selling basmati through super markets in small consumer packages under Indian brand names as there is a vast scope for basmati in the US.

With a good marketing and advertising strategy, it says, India could easily increase the exports of basmati from present 33000 to 300,000 tonnes. At present, India exports 300,000 tonnes of rice to West Asia but in the US, it could get much higher prices.

The major hindrance in selling basmati rice in the US, according to the association, is quality control and the fact that Indian basmati rice needs to be cleaned and soaked before being cooked.

The Secretary of the association, Mr. Prakash Shilkar, says India will have to use modern machinery to remove these two problems but investment will pay off soon.

Besides, he says the association has developed after extensive tests, a simple reliable procedure which gives exact basmati-non basmati percentage in a sample.

(Financial Express 21 August 1990, 10)

## 314 Tea exports

The country had reported Rs. 900 crore worth of tea last year, and the exports were expected to go up over Rs. 100 crore this year. He said the demand abroad was for value-added tea and satches, and not pulp tea.

(The Economic Times 7 September 1990, 14)

## 315 Cadbury plans to boost export of cocoa bean

Cadbury India Ltd proposes to maximise exports of cocoa bean.

The company had presented a paper to the Union Government on a strategy for earning Rs. 250 crores per annum foreign exchange by 2000 AD.

As much as 80 per cent of cocoa was grown in Kerala while Tamil Nadu and Karnataka accounted for the rest. Efforts are on by the company to grow cocoa in Andhra Pradesh also.

Out of the 6000 tonnes produced in the country, Cadbury consumption accounted for 80 per cent of which 1000 tonnes was exported by them in order to reduce the inventory cost.  
(Financial Express 1 August 1990, 4)

### 316 CCS on industrial alcohol off

Cash compensatory support (CCS) on export of industrial alcohol has been withdrawn.

A CCS of 10 per cent has introduced with effect from April 1, 1989, for a period of three years subject to a review after one year.

The Government has now withdrawn the incentive because alcohol-consuming industries in deficit states like Gujarat, Karnataka and Kerala are not getting their supplies. Even distillers in surplus States of Uttar Pradesh and Tamil Nadu are keen on exports.

The Government had authorised All-India Distillers Association to export, only part of the quantity allotted by the Government. The unutilised allocation of the previous year had been added to this year's allocation.

AIDA has been championing exports in view of the attractive international price and the incentive of cash assistance. AIDA can continue to export but new exports will not be eligible for CCS.  
(Financial Express 27 July 1990, 1)

### 317 Ceiling on export of wheat products

The government has placed a ceiling on the export of wheat products at the disposal of the Agricultural and Processed Food Products Export Development Authority (APEDA).

According to a public issue by the chief controller of imports and exports on July 19, exporters are required to register their contracts backed by 100 per cent irrevocable letters of credits with APEDA.

APEDA will not allocate more than 10 per cent of the total available ceiling to any individual exporter. It will allocate the ceiling after 15 days from July 19.

The wheat products include raw resultant atta, maida, suji and wholemeal atta (wheat flour of not less than 95 per cent extractions).

On fulfilment of the conditions, APEDA will issue ceiling slips to the exporters on a first-come, first-served basis indicating full particulars such as the name of the exporter, number and date of export order-contract and irrevocable letter of credit, quantity allowed, FOB value and the destination.



APEDA will send the ceiling advice to the concerned port licensing authority.  
(The Economic Times 26 July 1990, 6)

### 318 Registration norms amended for exporters

The Government on Friday said that relevant provisions requiring registration with the export promotion councils and commodity boards as well as with the Federation of Indian Export Organisations (FIEO) have been amended.

An exporter of multiple products whose f.o.b. value of exports in the preceding licensing year is more than Rs. 10 lakhs now has an option to get registration with each of the concerned export promotion councils or commodity boards.

In such a case, the exporter need not obtain registration with FIEO.

The Minister said that the Government had received representations from the exporting community regarding the difficulties faced by them as a result of the import and export policy requirement to compulsorily register themselves with FIEO for exports of more than Rs. 10 lakhs annually.

The decision to amend the provision has been taken in response to such representations.  
(Financial Express 12 August 1990, 3)

### 319 Export inspection council revamped

Union commerce minister Arun Nehru has reconstituted the export inspection council by inducting five non-official members, reports UNI.

They are the chairmen of the engineering export promotion council, chemicals and allied products export promotion council, council for leather exports and the Indian jute mills association and the president of sea food exporters' association.

The export inspection council was set up under the Export (Quality Control and Inspection) Act, 1963, with a view to advising the Central government regarding measures for enforcement of quality control and inspection in relation to the commodities notified for exports.

The council is headed by special secretary, ministry of commerce, and consists of eight non-official members and eleven official members representing various ministries of the government and technical institutions.  
(The Economic Times 15 August 1990, 1)

### 320 Move to close promotional offices may hit exports

The reported decision of the Centre to shut down promotional offices abroad as an austerity measure would act as a deterrent to Indian exports at large, reports PTI.

The Tea Board workmen's association apprehends that even Tea Board offices would not be spared the hatchet in this regard.

When contacted, Mr P.K. Bora, the Tea Board chairman, said that he was not aware of any such move to close down the Tea Board offices.

But even Mr. Bora agreed that a move in this direction especially in the markets where tea export prospects were promising would have adverse effect on exports.

According to the Tea Board workmen's association, the government decision to 'amputate the promotional limbs' of the Tea Board would enable other exporting countries to take advantage of a favourable market situation in major tea importing countries.

In this context, a spokesman of the association said that following the launching of the Darjeeling and Assam logo by the board, the potential of Indian tea was expected to improve further in UK and several European countries.

Referring to the report on the long-term strategy and plan for tea, the association said that the report has suggested extensive promotional campaign of value added teas in Gulf countries, north African countries, Australia, Japan, UK and West Europe.  
(The Economic Times 16 July 1990, 3)

## Import

### 321 Dry fruit imports

The import replenishment licences issued against export of apricot kernels/walnut kernels have been made valid for import of dry fruits up to their full value.

A public notice amending the policy was issued by the chief controller of imports and exports on July 20.

Earlier, export of apricot kernels/walnut kernels qualifying for import replenishment licences, were valid for import of dry fruits



upto two percent of the value of such licences, subject to a maximum of Rs. 1 lakh.

(The Economic Times 26 July 1990, 6)

### 322 Edible oil import

Detailing measures to improve the availability of oils and maintain the prices, Mr. Mirdha said that the allocation of imported oils through the Public Distribution System has been stepped up from 35,000 tonnes in March 1990 to 92,000 tonnes in September, 1990. He said that the blending of one conventional edible oil with one refined non-conventional oil has been permitted. This has led to the additional production to the tune of over 100,000 tonnes of edible oils this year. It has also helped in boosting exports realisation in the field of oilseeds and deoiled meal has gone up from Rs. 2177.5 million in 1987-88 to Rs. 5950 million in 1989-90.

The Hindustan Vegetable Oils Corporation, a public sector undertaking of the Government of India is shortly introducing the blend of groundnut oil and cotton-seed oil with the brand name "SANGAM".

(Economic and Commercial News 20(37), 1990, 9-10)

## Trade Information

### 323 Food industry seeks duty relief

The All India Food Preservers' Association has demanded removal or at least cut in the import and excise duties on packing material used by the food and vegetable industry. The organisation has also pleaded for removal of sales tax, local taxes and octroi on the industry's finished products. The organisation has pointed out that the packing cost often exceeds the cost of the product itself as far as the food industry is concerned.

(Chemical Products Finder 9(2), 1990, 132)

### 324 Maharashtra withdraws ST on gur

Maharashtra minister of state for finance Arun Gujarati yesterday announced in the legislative council the withdrawal of the proposed two per cent sales tax on gur.

(The Economic Times 10 August 1990, 2)

## 325 Copra floor price raised

The minimum support price (MSP) for average quality copra has been raised by Rs. 100 per quintal to Rs. 1,600 per quintal for 1990.

The Commission for Agricultural Costs and Prices (CACP) had earlier fixed MSP for copra at Rs. 1,500 per quintal, the Minister of State for Agriculture, Mr. Nitish Kumar, told the Rajya Sabha members on Friday.

Meanwhile, the estimated production during 1988-89 of oil from trees of forest origin is 1.5 lakh tonnes. The average percentage of oil recovery ranged from 12.5 per cent in the case of sal to 35 per cent in the case of mahua.

The Ministry of Welfare has been entrusted with the task of increasing the collection, processing and development of oilseeds of trees of forest origin.

(Financial Express 18 August 1990, 1)

## 326 Schemes to boost food processing units

The Ministry of Food Processing Industries has chalked out schemes to promote the growth of food processing industries in the current year. Schemes for strengthening linkages between growers and processors of fruits and vegetables have been undertaken. Other steps include strengthening of quality control and development of infrastructural facilities. Schemes have also been proposed for processing of poultry and modernisation of grain milling industry for effective utilisation of its by-products. Three development councils have been set up under the Ministry to identify the problems and constraints faced by the different sectors of the food processing industries.

(Industrial Products Finder 18(9), 1990, 91)

## 327 Two edible oil units in Tamil Nadu likely

Two edible oil factories for producing oil from paddy bran are to be set up in Tamil Nadu, Mr. J.V. Sankar, Joint Commissioner, Civil Supplies Corporation, said on Sunday.

One of the factories would be located in Purumkulam in Thanjavur district, he told PTI here. The site for the second one was under consideration.

Consumer dispute forums would be set up in every district under the chairmanship of district judges. The forum would comprise three members. Petitions filed by consumers before this forum would be disposed of within three months, he added.

(Financial Express 20 August 1990, 1)



**328 Searle India to launch aspartame**

Searle India Ltd plans to launch equal, G.D. Searle's global brand of aspartame, by year-end.

Aspartame, a synthetic sugar, is an original discovery of G.D. Searle. Like other existing companies which market the product, Searle India too plans to import aspartame and formulate the chemical into table top products.

The market for synthetic sweeteners is estimated around Rs. 2 crore at present. There are four versions of aspartame in the market. The leading ones being Sugarfree of Cadila and One Up of Torrent Laboratories.

Worldwide, table top accounts for only 20 per cent of aspartame sales, the lion's share going into foods and beverages. Diet Coke and a host of other beverages and food products abroad are sweetened with aspartame.

Unlike sacharin, which cannot be metabolised by the body, aspartame is a protein which is metabolised like any other protein within the body. One spoon of sugar has 16 calories. In contrast, one tablet of aspartame has only 0.4 calories for equivalent sweetness. (The Economic Times 22 September 1990, 3)

**329 Lipton to focus on food and beverage**

Lipton India Ltd is concentrating on development of products in the food and beverage areas, particularly those based on milk and agricultural produce. In carrying out its R&D activities, Lipton is drawing upon the facilities of Unilever as also Hindustan Lever, which has a well-equipped research centre at Andheri in Bombay. The company plans to make additional investments in setting up facilities that will help reduce energy consumption. (Chemical Products Finder 9(2), 1990, 140)

**330 Plea for talks on coffee pact**

Coffee producing nations have made a forceful plea at the recent International Coffee Council (ICC) meet for early negotiations on a new agreement with economic provisions and for reintroduction of quotas from next year.

According to the Coffee Board Chairman, Mr. P.K. Ramaiah, who returned after attending the 56th session of ICC held at London from September 17 to 28, producers including Columbia and the African countries, with the notable exception of Brazil, have appealed strongly for the constitution of a negotiating group.

He said India too desired immediate negotiations for new agreement with economic clauses. Although some of the consuming members sympathised with the sufferings of producers, the US, like Brazil, desired an additional extension of the 1983 agreement without economic clauses for one more year up to September 1992, he added.

According to Mr. Ramaiah, the reason given in support of extension of the agreement is that a free market for one year was not sufficient to assess the reaction of the market. Therefore, extension by one or two years more was considered essential to make a sound evaluation of the situation.

He said a reconciliation could be brought about by the exporting and importing members resulting in the adoption of a resolution by the Council extending the 1983 agreement.

Mr. Ramaiah said concurrent to the ICC meeting, ICO's executive board and the promotion committee also met. Besides the plenaries of the producers and the consumers, various regional groups also held their meetings.

(Financial Express 5 October 1990, 1)

### 331 Tea Board offices abroad

The government will save up to Rs. 3.5 crore as a result of closure or rationalisation of the functioning of tea board offices abroad and the takeover of marketing by the Bharat Business International Limited (BBIL), commerce minister Arun Nehru said.

He said the 12 offices abroad dealing with different commodities were being closed or merged with other office to reduce costs and avoid duplication of activity.

(The Economic Times 7 September 1990, 14)

## Food Regulation, Quality Control & Hygiene

### 332 Central Excise on pickles and others

G.S.R. 152(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986), specified in the corresponding entry in column (2)



of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) there of:-

Sl.No.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	2001.10	Pickles	Nil
2.	2001.10	All goods other than those specified as S.No.1 above	10% ad valorem

(The Gazette of India Part II- Section 3 Sub-section (i), No.113, 1990, 7)

### 333 Central excises on ice-cream

G.S.R. 153 (E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government being satisfied that it is necessary in the public interest so to do, hereby exempts ice-cream falling under heading No. 2105.00 of the Schedule to the Central Excises Tariff Act, 1985 (5 of 1986), manufactured in hotels and restaurants and sold in retail in the same premises where such ice-cream is manufactured from the whole of the duty of excise leviable thereon which is specified in the said Schedule.

Explanation - For the purpose of this notification "ice-cream" means those preparations which are commonly known as ice-cream or kulfi and in the preparation of which milk, cream or any other product of milk is used.

[No. 334/10/89-TRU]

(The Gazette of India Part II - Section 3 - Sub-section (i) No.113, 1990, 7-8)

### 334 Central Excise exemption

G.S.R. 154(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986) specified in the corresponding entry in column (2) of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) thereof:-

TABLE

Sl.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	2101.30	All goods	Nil
2.	2103.11	Chutney	Nil
3.	2103.19	All goods	Nil
4.	2105.00	Ice-cream	10% advalorem
5.	2105.00	Goods other than those speci- fied at S.No.4	Nil
6.	2106.90	All goods	Nil
7.	2107.91	Soya textured protein	Nil
8.	2107.91	Papad, idli-mix, vada-mix dosa-mix, jalebi-mix, gulab- jamun-mix or namkeens, such as bhujia, chabena	Nil

Explanation - For the purpose of this notification "ice-cream" means those preparations which are commonly known as ice-cream or kulfi and in the preparation of which milk, cream or any other product of milk is used.

(The Gazette of India Part II - Section 3 -Sub-section (i) No.113, 1990, 8-9)

### 335 Central Excise amendment

G.S.R. 214(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby makes the following further amendment in the notification of the Government of India in the Ministry of Finance (Department of Revenue) No.160/86-Central Excises. dated the 1st March, 1986, namely:-

In the Table annexed to the said notification for S.No. 5 and entries relating thereto, the following S.No. and entries shall be substituted, namely:-

1	2	3	4
"5.	85.09 85.10 or 85.16	(a) Domestic electrical appliances, the following namely:-  (i) Vacuum cleaners; (ii) Floor polishers; (iii) Grinders and mixers; (iv) Juice extractors; (v) Cream Whippers and egg beaters; (vi) Geysers and water heaters, all types, but excluding immersion heaters;	Twenty per cent ad valorem



(vii) Shavers;	
(viii) Hair dryers, hair curlers, permanent waving apparatus and curling tong heaters;	
(ix) Steamers, coffee makers (including percolators of the domestic type), cookers, egg boilers;	
(x) Hot plates, grillers, boiling plates, plate warmers, food warming trays, food warming trollies, hot food cabinets;	
(xi) Coffee roasting appliances;	
(xii) Room heaters fitted with air circulation device;	
(xiii) Ice cream churners;	
(xiv) Domestic ovens (other than micro oven) of all types;	
(xv) Rectangular Beverage Jug (hot),	
(b) Cooking ranges	Twenty five per cent ad valorem
(c) Microwave Ovens	Twenty five per cent ad valorem
(d) Other domestic electrical appliances	Nil
(e) Goods other than domestic electrical appliances	Twenty per cent ad valorem
(f) Parts	Twenty per cent ad valorem".

(The Gazette of India Part II - Section 3 -Sub-section (i)  
No.113, 1990, 96)

### 336 Prevention of Food Adulteration Rules 1955 (Amendment)

G.S.R. 457(E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954), with the notification of Government of India, in the Ministry of Health and Family Welfare (Department of Health) No. GSR 1066(E) dated the 27th December, 1989 in the Gazette of India, Extraordinary, Part II Section 3, Sub-section (i), dated the 27th December 1989, at pages 1-6, inviting objections and suggestions from all persons likely to be affected thereby before the expiry of sixty days from the date of which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said notification were made available to the public on 15th January 1990.

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with Central Committee for Food Standards, hereby

makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

### RULES

1. These rules may be called the Prevention of Food Adulteration Fourth (Amendment) Rules, 1990.

2. They shall come into force on the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as said rules) -

"(i) for clause (zz) of rule 42, the following clause shall be substituted namely:-

"(zz) Every package containing an admixture of edible oils shall carry the following label, namely:-

This blended edible oil contains an admixture of -

(i) -----% by weight  
(ii) -----% by weight  
(Name of oils)  
Date of packing -----

(ii) In rule 44 of the said rules, for the seventh proviso the following proviso shall be substituted, namely:-

Provided also that the prohibition in clause (e) shall remain inoperative in respect of the admixture of non-conventional edible oil (that is to say, cotton seed oil, rice bran oil or soyabean oil or sunflower oil or sunflower oil conventional edible oils (that is to say, coconut oil, groundnut oil, mustard oil or til oil) where --

(a) the proportion of conventional oil, (that is to say, coconut oil, groundnut oil, mustard oil or til oil) in the admixture is not less than 20 per cent by weight;

(b) the admixture of edible oils is processed and sold by the Department of Civil Supplies, Government of India (Directorate of Vanaspati, Vegetable Oils and Fats), or the authorised agencies of that Department and the State Cooperative Oilseeds Growers Federation set up under National Dairy Development Board's Oilseed and Vegetable Oil Project in sealed packages weighing not more than 5 kgs. under Agmark certification mark compulsorily and bearing the label declaration as laid down in clause (ZZ) of rule 42;

(c) the quality of each edible oil used in the admixture conforms to the relevant standard prescribed by these rules".

(iii) in Appendix 'B' of the said rules, for item A.17.24, the following item shall be substituted, namely:-



"A.17.24 - Blended edible oil means a mixture of two vegetable oils. The blend shall be admixture of a conventional raw edible oil (that is to say, coconut oil, groundnut oil, mustard oil or til oil) obtained by mechanical expression, with a non-conventional edible refined oil (that is to say, cotton seed oil, rice bran oil or soya-bean oil or sunflower oil or safflower oil) in which the proportion of conventional oil shall not be less than 20 per cent by weight. The individual oil in the blend shall conform to the respective standards prescribed by these rules. The blend shall not contain any imported oil. It shall not be sold in loose form. It shall also not be sold under the common or generic name of oils used in the blend but may be sold as "Blended Edible Oils" and shall bear the label declaration as laid down in clause (ZZ) of rule 42. The blend shall be clear, free from rancidity, suspended or insoluble matter or other foreign matter, separated water, added colouring matter, flavouring substances, mineral oil, any other animal and vegetable oils, or fats, argemone oil, hydrocyanic acid, castor oil and tricresyl phosphate. It shall also conform to the following standards, namely:-

- (a) Moisture and volatile matter
  - Not more than 0.2 per cent by weight
- (b) Acid value
  - Not more than 2.0
- (c) Unsaponifiable matter
  - (i) Blend with rice bran oil
    - Not more than 3.00 per cent by weight
  - (ii) Blend with other edible oils
    - Not more than 1.00 per cent by weight
- (d) Flash point (penske-Martin closed method)
  - Not less than 250°C

(The Gazette of India Part II - Section 3 - Sub-section (i) No.167, 1990)

### 337 Prevention of Food Adulteration Rules 1955 (Amendment) 1990

G.S.R. 445(E) - Whereas certain draft rule further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954), in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) No. GSR 769 (E) dated the 21st August 1989 in the Gazette of India, Extraordinary, Part-II Section 3, Sub-section (i), dated the 21st August, 1989 at pages 1-16, inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of sixty days from the date on which copies of the Gazette of India in which the said notification was published, was made available to the public;

And whereas the copies of the said Gazette were made available to the public on 20th September, 1989.

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely:-

### RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Third Amendment) Rules, 1990.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 in rule 65, in the Table, after serial number 31 and entries relating thereto, the following serial numbers and entries shall respectively be inserted, namely:

Sl.	Name of Insecticide	Food	Tolerance limit mg/kg (ppm)
32	Acephate	Safflower seed Cotton seed	2.0 2.0
33	Methamido-phos (A metabolite of Acephate)	Safflower seed Cotton seed	0.1 0.1
34	Aldicarb (sum of Aldi- carb, its sulphoxide and sulphone, expressed as Aldicarb)	Potato Chewing Tobacco	0.5 0.1
35	Atrazine	Maize Sugarcane	0.25 0.25
36	Carbendazim	Foodgrains Milled foodgrains Vegetables Mango Banana (whole) Other fruits Cotton seed Groundnut Sugar beet Dry fruits Eggs  Meat and Poultry  Milk and Milk Products	0.50 0.12 0.50 2.00 1.00 5.00 0.10 0.10 0.10 0.10 0.10  0.10 (shell free basis) 0.10 (Carcass fat basis) 0.10 (Fat basis)



37	Benomyl	Food grains	0.50
		Milled foodgrains	0.12
		Vegetables	0.50
		Mango	2.00
		Banana (whole)	1.00
		Other fruits	5.00
		Cottonseed	0.10
		Groundnut	0.10
		Sugarbeet	0.10
		Dry fruits	0.10
		Eggs	0.10
			(shell free basis)
		Meat and Poultry	0.10
			(carcass fat basis)
		Milk and Milk Products	0.10
			(fat basis)
38	Captan	Fruit and Vegetable	15.00
39	Carbofuran (sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)	Foodgrains	0.10
		Milled foodgrains	0.03
		Fruit and Vegetables	0.10
		Oil Seeds	0.10
		Sugarcane	0.10
		Meat and Poultry	0.10
			(carcase fat basis)
		Milk and Milk Products	0.05
			(fat basis)
40	Copper Oxychloride (determined as Copper)	Fruit	20.00
		Potato	1.00
		Other vegetables	20.00
41	Cypermethrin (sum of isomers) (fat soluble residue)	Wheat grains	0.05
		Milled wheat grains	0.01
		Brinjal	0.20
		Cabbage	2.00
		Bhindi	0.20
		Oil seeds except groundnut	0.20
		Meat and Poultry	0.20
			(carcass fat basis)
		Milk and Milk Products	0.01
			(fat basis)
42	Decamethrin/Deltamethrin	Cotton seed	0.10
43	Edifenphos	Rice	0.02
		Ricebran	1.00
		Eggs	0.01
			(shell free basis)
		Meat and Poultry	0.02
			(carcass fat basis)
		Milk and Milk Products	0.01
			(fat basis)

44	Fenthion (sum of fenthion, its oxygen analogue and their sulphoxides and sulphones, expressed as fenthion)	Foodgrains	0.10
		Milled foodgrains	0.03
		Onion	0.10
		Potatoes	0.05
		Beans	0.10
		Peas	0.50
		Tomatoes	0.30
		Other Vegetables	1.00
		Musk melon	2.00
		Meat and Poultry	2.00
			(carcass fat basis)
		Milk and Milk Products	0.05
			(fat basis)
45	Fenvalerate (fat soluble residue)	Cauliflower	2.00
		Brinjal	2.00
		Okra	2.00
		Cotton seed	0.20
		Cottonseed oil	0.10
		Meat and Poultry	1.00
			(carcass fat basis)
		Milk and Milk products	0.01
			(fat basis)
46	Dithiocarbamates (the residue tolerance limit are determined and expressed at mg/CS <sub>2</sub> /kg and refer separately to the residues arising from any or each groups of dithiocarbamates (a) Dimethyldithiocarbamates residue resulting from the use of ferbam or Ziram and, (b) Ethylene bis-dithiocarbamates resulting from the use of mancozeb, maneb or Zineb (including zineb derived from nabam plus zinc sulphate)	Foodgrains	0.20
		Milled foodgrains	0.05
		Potatoes	0.10
		Tomatoes	3.00
		Cherries	1.00
		Other fruits	3.00
47	Phenthoate	Foodgrains	0.05
		Milled foodgrains	0.01
		Oilseeds	0.03
		Edible oils	0.01
		Eggs	0.05
			(shell free basis)
		Meat and Poultry	0.05
			(carcass fat basis)
		Milk and Milk Products	0.01
			(fat basis)



48	Phorate (sum of phorate, its oxygen analogue and their sulphoxides and sulphones, expressed as phorate)	Foodgrains	0.05
		Milled foodgrains	0.01
		Tomatoes	0.10
		Other vegetables	0.05
		Fruits	0.05
		Oil seeds	0.05
		Edible oils	0.03
		Sugarcane	0.05
		Eggs	0.05
		(shell free basis)	
		Meat and Poultry	0.05
		(carcass fat basis)	
		Milk and Milk Products	0.05
		(fat basis)	
49	Simazine	Maize	0.13
		Sugarcane	0.25
50	Pirimiphos-methyl	Rice	0.50
		Wheatgrains	5.00
		Milled wheat grains	2.50
		Eggs	0.05
		(shell free basis)	
		Meat and Poultry	0.05
		(carcass fat basis)	
		Milk and Milk Products	0.05
		(fat basis)	

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(The Gazette of India Part II - Section 3 -Sub-section (1) No.156, 1990)

### 338 Central Excises Exemption

G.S.R. 15(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises Salt Act, 1944 (1 of 1944), the Central Government being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986), specified in the corresponding entry in column (2) of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) thereto:-

TABLE

Sl. No.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	1901.90	All goods other than (i) malt extract or (ii) food preparations containing malt or malt extract or cocoa powder in any proportion	Nil
2.	1902.10	Seviyan (Vermicilli)	Nil
3.	1903.10	Sago	Nil
4.	1903.10	All goods other than that at Sl. No.3	10% ad valorem

(The Gazette of India Part II - Section 3 -Sub-section (i) No.113, 1990, 6)

### 339 Khandsari production and sales - Rules

G.S.R. 456 (E) Ess. Com./Sugar - In exercise of the powers conferred by clause 5 of the Sugar (Control) Order, 1966, the Central Government hereby directs that every producer of Khandsari (open pan sugar) shall -

(1) declare his opening stocks of khandsari as on 30th April, 1990 and also the quantity produced in each month thereafter till the 30th September, 1990 to the specified authority;

(2) sell and despatch not less than 30 per cent, of the stocks as on 30th April 1990 declared in accordance with the provisions of paragraph (1) during each of the months of May and June, 1990;

(3) furnish particulars of stocks, production, sales and despatch of khandsari for each month latest by the 7th day of the following month to the specified authority.

Provided that the opening stocks of khandsari as on the 30th April, 1990 shall be declared on or before 7th May 1990.

EXPLANATION - For the purpose of this order, "Specified authority" means the Collector of the District in which the producer's khandsari unit is located or such other authority as the State Government may specify in this behalf.

2. This order shall come into force at once.

(The Gazette of India Part II - Section 3 - Sub-section (i) No. 166, 1990)



## 340 Vegetable Oils Grading and Marking (Amendment) Rules 1990

G.S.R. 289 - Whereas draft of the Vegetable Oils Grading and Marking (Amendment) Rules, 1989, which the Central Government proposes to make amendment to the Vegetable Oils Grading and Marking Rules, 1955, was published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act 1937 (1 of 1937), under the notification of the Government of India Ministry of Agriculture, Department of Rural Development in the G.S.R. 350 dated the 19th April, 1989, on pages 1179 to 1181 of the Gazette of India, Part II, Section 3, Sub-section (i) dated the 13th May 1989, inviting objections and suggestions from all the persons likely to be effected thereby, before the expiry of the period of forty-five days from the date on which copies of the official Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 30th May 1989;

And whereas the objections/suggestions received in respect of the said draft rules have been considered by the Central Government,

Now, therefore in exercise of the powers conferred by section 3 of the said Act, the Central Government hereby makes the following rules further to amend the Vegetable Oils Grading and Marking Rules, 1955, namely:-

## RULES

1. These rules may be called the Vegetable Oils Grading and Marking (Amendment) Rules, 1990.

2. They shall come into force on the date of their publication in the Official Gazette.

3. In the Vegetable Oils Grading and Marking Rules, 1955 -

(a) in schedule II(d), for serial number (vi) and the entries relating thereto, the following serial number and entries shall be substituted namely: -

"(vi) Castor Oil

Medicinal.....Mauva  
Firsts Special.....Red  
Commercial Grade-I...Blue  
Commercial Grade II...Yellow",

(b) for schedule IX, the following Schedule shall be substituted namely:-

**SCHEDULE-IX**  
**(See rules 3 & 4)**  
**AGMARK GRADE DESIGNATION AND DEFINITIONS OF QUALITY**  
**FOR CASTOR OIL**

Grade designation	Description	Clarity in height of column of oil in cms. through which Bourgois print can be read in 100 ml Nessler tube	Colour on Lovibond scale expressed as Y+5R (Maximum)
1	2	3	4
Medicinal*	The oil shall be the refined fixed oil obtained by cold expression of castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	10.0	3.5 (in 1 "Cell)
Firsts Special	The oil shall be the refined fixed oil obtained from castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	10.0	3.7 (in 1" Cell)
Commercial Grade-I	The oil shall be the fixed oil obtained from castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	5.0	30.0 (1/4" Cell)
Commercial Grade-II	-do-	-	40.0 (in 1/4" Cell)



Specific gravity at 30 C/ 30 C	Refractive index at 40 C	Saponification value	Iodine Value (Wijs method)	Acetyl Value (minimum)	Saponifiable matter (Percent (Maximum))	Acid Value (Maximum)
5	6	7	8	9	10	11
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	142	0.0	2.0
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	143	0.8	2.0
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	143	1.0	4.0
0.954 to 0.960	1.4700 to 1.4800	176 to 187	82 to 90	143	1.0	6.0
Critical solution temperature in alcohol, (below)	Moisture & impurities per cent by weight (maximum)	Optical rotation at 19.5° to 20.5° on 1 cm thickness (Minimum)	Solubility		entification	
12	13	14	15		16	
0° C	0.25	+3.5°	Soluble in 2.5 parts of ethyl alcohol (95% V) Miscible with Absolute Ethyl alcohol with chloroform with solvent ether and with glacial acetic acid		Miscible with half its volume of light petroleum (boiling range 40° C to 60° C) and is only partially soluble in two volumes.	
0° C	0.25		-		-	
	0.75		-		-	
	1.00		-		-	

N.B. - \*Permission for grading medicinal grade castor oil shall be granted to only such packers who own an oil crushing and refining plant for extracting castor oil in cold and refining the same and satisfy the conditions prescribed under the instructions issued from time to time in this behalf.  
(The Gazette of India Part II - Section 3 Sub-section (i) No. 19, 1990)

## 341 New and revised Indian Food Standards

IS 3752: 1988	Alcoholic drinks - Methods of test (first revision). Gr.5
IS 9328: 1989	Confectionery industry - Glossary of terms (first revision). Gr.4
IS 11962: 1987	Method for determination of ash in rennet caseins and caseinates (reference method). Gr.2
IS 12711: 1989	Bakery products - Methods of analysis. Gr.7
IS 12756: 1989	Cheese and cheese products - Determination of total phosphorous content - Molecular absorption spectrometric method. Gr.3
IS 12757: 1989	Cheese and processed cheese products - Determination of citric acid content (reference method). Gr.2
IS 12760: 1989	Dried milk - Determination of sodium and potassium contents- Flame emission spectrometric method. Gr.3

(Standards India, May, July 1990)

## 342 Pure ghee is anti-cancerous

Research carried out at the National Dairy Development Board (NDDB) by Dr R.P. Aneja and Mr. T.N. Murthy has established that pure ghee contains substantial quantities of anti-carcinogenic (anti-cancer) substances called conjugated linoleic acids (CLA).

A NDDB release said here yesterday that CLAs are produced in the rumen (first stomach) of cows and buffaloes by microbial fermentation. Earlier research had shown that CLAs are produced by fermentation and by heating fats in presence of proteins. CLAs are produced out of the linoleic acid which is an unsaturated fatty acid present in milk fat.

(The Times of India 8 September 1990, 12)



**343 Anti-mutagenic properties of turmeric**

Research at the National Institute of Nutrition, Hyderabad, has confirmed the anti-mutagenic effects of turmeric in humans, reporting that it may act as a preventive against several dietary carcinogens.

Similar anti-cancer properties of turmeric were reported earlier in animals.

Studies at NIN showed that turmeric, when incorporated at 0.5 per cent in the diet, had significant anti-mutagenic effects against a single dose of benzopyrene. Further studies conducted this year with lower doses of turmeric and different carcinogens in rats confirmed these results.

The studies also showed that turmeric, was anti-mutagenic against carcinogens like 3-methyl cholanthrene which is known to damage DNA.

Turmeric had considerable toxicity against urinary carcinogens which are excreted by smokers. Experiments with nine normal male volunteers all chronic smokers and between 45 and 60 years of age, showed that when turmeric in doses of 1.5 grams per day were administered in the form of tablets, for 30 days, there was a considerable decrease in the urinary mutagens.

There is also experimental evidence to suggest that turmeric has cholesterolemic and hypoglycaemic effects. Blood samples of smokers who were given turmeric indicated normal levels of glucose, total and high density lipoprotein cholesterol and triglycerides. Turmeric also did not have any toxic or nephrotoxic effects.  
(P.T.I. Science Service 9(15), 1990, 3)

**344 Vanaspati units allowed to use mustard oil**

Vanaspati industry has been permitted to use expeller mustard oil upto 20 per cent of its raw material requirements.

According to information reaching at Bombay from Delhi, the Union Civil Supplies Ministry will make a formal announcement shortly.

Use of expeller mustard oil by vanaspati units was discontinued sometime in August 1989 and since then the industry has been pleading in vain to allow reuse.

The Government decision is expected to improve marketability of rape/mustard oil prices of which are ruling at less than Rs. 17,000 a tonne.

For the vanaspati industry, which has been forced to cut down its production due to heavy input cost, the Government decision will be a welcome relief. The industry has been meeting its requirements from indigenous oils such as cottonseed and soyabean since early last year when the Government decided to fully discontinue allocation of imported oil at subsidised rates.

Apart from helping vanaspati units, Government intention is obviously to safeguard farmers' interest by stabilising oil and seed prices. Like last two successive seasons, rabi crop this year too is expected to be a bumper 40 lakh tonnes.

The Government has already allowed the National Dairy Development Board (NDDB) to export 25,000 tonnes of mustard oil. Although this is being done to bail out NDDB, which is nursing huge stocks, it has generated a lot of interest in the industry. Private trade in Bombay feels Government should allow them to export rapeseed, to stabilise local prices.

For the past few months, there has been a drop in the vanaspati output with average monthly production declining to 70,000 tonnes as against 90,000 tonnes.

(The Oils and Oilseeds Journal 43(1), 1990, 34-35)

#### 345 Pollution control cells in States

All the States except Nagaland and Arunachal Pradesh have taken steps for implementing the environmental laws by setting up State Pollution Control Boards.

Stating this in a written answer in the Lok Sabha on Monday the Environment and Forests Minister Mr. Nilamani Routary, said the Central Pollution Control Board has initiated steps to set up a joint board for both the States under Section 13 of the Water (Prevention and Control of) Pollution Act 1974. The Centre has approached the north eastern council for taking on the functions of the State board for Nagaland.

He said 3160 cases under the Water (Prevention and Control of Pollution) Act, 1974 and 830 cases under the Air (Prevention and Control of Pollution) Act, 1981 have been filed.

(Financial Express 28 August 1990, 4)

#### 346 Cooking up carcinogens - the chemicals generated in our food

Chemical reactions that take place during cooking, baking and preserving generate products that are very important in giving different foods their distinctive aromas and colour. Recently, researchers have discovered that many of these products can reduce the food's nutritional value, and some can actually be poisonous.

Franze Ledl of Stuttgart University and Erwin Schleicher of the academic hospital Munich Schwabing in West Germany have studied many of the reactions involved, which are known collectively as the Mail-



lard reaction. They believe that the reaction products could cause some diseases, including certain forms of cancer (Angewandte Chemie, International Edition in English, 1990, vol. 29, p. 565).

Maillard products form when sugar molecules react with amino acids, the constituent units of proteins. The sugar found in the food - for example, fructose and glucose - can exist in a linear form that has a reactive carbonyl group ( $C=O$ ), and amino acids, such as lysine, have at least one reactive amine group ( $NH_2$ ). Given the right conditions, a carbonyl reacts with an amine group, and the product slowly rearranges to form a so-called "Amadori compound". Once formed in food, Amadori compounds cannot change back and can, in fact, react further to form Maillard products.

Compounds such as furanones, which have a roasted, caramel-like aroma, and the brown pigments found in the crust of a loaf of bread are all formed by the Maillard reaction. The Maillard reaction can even take place in the body, making cross-links between proteins and so damaging the genetic material ('Sweet peril for proteins', New Scientist, 3 March 1988).

Ledl and Schleicher have found Amadori compounds in foods that contain proteins and sugars that have been cooked, stored or even sterilised. Because Amadori compounds are formed from amino acids, this effectively robs the food of some of its nutritional value. This is important for foods, such as powdered milk, that are sterilised for babies. Growing children need a diet rich in amino acids for proper development, so particular care must be taken during manufacturing to prevent damage to essential amino acids.

The amino acid tryptophan, which is found in soya protein, does not form Amadori compounds, but it does form compounds that have been shown to be highly carcinogenic. However, the carcinogens form in significant quantities only when the cooking temperature is more than 130 C. This could explain why the Japanese and Chinese, who use mild cooking techniques, suffer less from certain cancers than those people in the West who boil and roast their food.

There is a positive side to the Maillard reaction. Without it, freshly baked bread would not have its delicious smell. Sunday roasts would look pale and unappetising and fresh ground coffee would be weak and tasteless. Some Maillard products have even been found to prevent cancer.

Ledl and Schleicher believe that suppressing the bad and increasing the beneficial aspects of the Maillard reaction should be the aim of research.

(New Scientist No.1729, August 1990, 32)

### 347 Drumstick seeds purify water

The common drumstick *Moringa oleifera*, has been found to have excellent use in water treatment. The water purifying properties of the seeds extracted from the lance-like fruits of moringa is known to the Sudanese for a long time, and scientists at the University of



Leicester in the U.K. have launched an interesting research project to confirm its potentials as a water purifier.

The seeds act as good coagulants, can help in treating drinking water and may come in handy for the rural people who quite often pick up intestinal infections by consuming contaminated water. For water treatment, the white kernel inside the winged seeds should be removed and after crushing it should be mixed with small quantities of pure water by constantly stirring with a spoon for about five minutes. The suspension is to be poured through a strainer on to the stored turbid water and stirred with a wooden stick for 10 minutes. About 30 seeds will be needed for clarifying 40 litres of water.

According to scientists when mixed with river water the pulped seeds give water-soluble proteins that are able to bind finer particles of sediments suspended in the water together forming what is known as floc. Bacteria viruses get enmeshed in the floc and after a period of slow mixing all the colloidal particles settle down at the bottom of the container. The action of the seed pulp is similar to that of the application of aluminium sulphate (alum) commonly used in water treatment, but it is an inexpensive and effective way for the villagers.

(The Hindu 4 August 1990, 4)

#### 348 New fat-free ice cream

Kraft General Foods is testing a fat free ice cream called 'Sealtest Free Non-fat Ice Cream, without the 10% butterfat required under the ice cream standard. The new fat and cholesterol free product with 100 calories a serving, has the taste, texture and appearance of ice-cream. Cellulose gel is the bulking agent in the product. Kraft will have to ask for the amendment of the ice cream standard.

(Chemical Weekly 35(43), 1990, 97)

#### 349 Sani-straw

There are plenty of water purifiers around, but none is as portable as the Accu-Filter - a new water purifying straw from Accuventure, Inc., of Portland, Oregon. The Accu-Filter looks like an oversize (21-centimeter-long) blue straw and works much the same; stick it in a glass of contaminated water and (gulp!) drink. Before the water hits your lips, it goes through a three-stage filtration process that supposedly screens out 98 per cent of 151 harmful chemicals, pollutants and contaminants. The product's inventor, Bruce Spangrud, says drinking out of the straw is much like drinking a thick milkshake. He recommends adding chlorine tablets to especially dirty water; the straw will filter out the chlorine. One AccuFilter will filter 30 gallons of water. The straw is sold throughout the world - Cost is \$ 13.

(Newsweek 16 July 1990, 3)



## 350 Bact-O-kill for safe drinking water

BACT-O-KILL is a new domestic utility device designed and developed by the Indian Toxicology Research Centre (ITRC), Lucknow, to provide safe drinking water to homes.

The electronic device has been developed by a team of ITRC scientists led by Dr. P.K. Ray, to provide clean, disinfected water at a very low cost under the "Water Technology Mission Programme" launched by the Government of India.

The scientists report that experiments conducted after treating the infected tap water in BACT-O-KILL gave "very encouraging" results.

They claim that all the bacteria are killed in 40-45 minutes of treatment. Analysis of the treated water showed that metallic contamination due to the presence of copper, zinc, lead and cadmium was reduced.

The operating cost of the new device is almost negligible, only 10 paise per hour per 10 litres of water. The treated water has prolonged microbicide effect, no health and electric hazards and the device does not require much maintenance.  
(P.T.I. Science Service 9(13), 1990, 4)

## 351 Britain bans 'natural' food supplement after health fears

Hundreds of cases of illness and 22 deaths linked with L-tryptophan, a "natural" food supplement, may have been triggered by a contaminant. Britain's Department of Health has banned the sale of products to which L-tryptophan, an essential amino acid, has been added. The ban follows seven cases of illness in Britain and 1500 cases and 22 deaths in the US.

L-tryptophan is a natural constituent of certain foods such as milk and cheese, where it is harmless. But until the ban, health shops also sold the amino acid in tablet form as a dietary supplement to aid sleep and combat premenstrual tension. It is these products that epidemiologists have linked with symptoms such as severe muscle pain, breathing difficulties caused by fluid accumulating in the lungs, and raised levels of eosinophils, a kind of white blood cell.

Last month scientists met in Los Alamos, New Mexico, to discuss these illnesses, known together as eosinophilia myalgia syndrome (EMS). They produced evidence showing that virtually all cases of EMS in the US could be traced to a few batches of L-tryptophan from a single manufacturer, Showa Denko in Japan.

Chromatographic analysis of these batches showed an impurity, "Peak E", which was not present in other samples of L-tryptophan. Researchers have not yet identified the substance but they strongly suspect that it triggers biological events leading to EMS.

Samuel Page, of the US Food and Drug Administration says the amount of "Peak E" in the samples was very small, making its analysis "difficult and frustrating".

Showa Denko is one of seven manufacturers in Japan that supply the West with L-tryptophan. The company produced the amino acid from anthranilic acid by bacterial fermentation. The period when the "hot lots" were made coincides with a change in the strain of bacteria the company used. Japan's government told Showa Denko to recall all L-tryptophan products in April.

The cause may not be simple. Although some of the scientists at the meeting thought that EMS could be attributed directly to the impurity alone, most agreed that it triggers a complex chain of physiological events including autoimmune responses and changes in the way the body metabolises L-tryptophan itself. A study in the New England Journal of Medicine (vol 322, p. 874) showed that people with active EMS metabolised L-tryptophan differently from healthy controls and people who had recovered from EMS.

The government advised health food shops to stop selling L-tryptophan last November when the US banned sales. The National Association of Health Food Stores supported this voluntary measure. (New Scientist 7 July 1990, 18)

### Transfer of Technology & New Industries

#### 352 Sarda Plywood corn syrup project

Sarda Plywood Industries Ltd (SPIL) has signed a memorandum of understanding (MoU) with the Uttar Pradesh State Industrial Development Corporation (UPSIDC) for setting up a Rs.35-crore joint sector unit to make high fructose corn syrup. The project would have imported technology.

(Financial Express 22 September 1990, 4)

#### 353 Soft drink plant in Madurai

The first soft drink plant in India with the capacity of filling 550 bottles per minute along with a sophisticated water treatment plant and other facilities, has been set up in Madurai by the Bangalore-based City Drinks, bottlers of Lehar-Pepsi.



Indian Bank Chairman and Managing Director, Mr. M. Gopalakrishnan, launched the production at Rs. 4.5 crore plant here on Saturday.

Speaking on the occasion, Mr. Adaikala Raj, MP and Chairman of the company, said the demand for Pepsi in the four southern States was to the tune of 62,000 to 70,000 bottles per day. City Drinks' Bangalore plant produced 10,000 bottles. The Madurai plant would supplement with another 20,000 and a bigger plant at Madras would be ready within three months.

(Financial Express 30 September 1990, 8)

#### 354 Caffeine Plant set up in Jorhat

A 30-tonne-per-annum caffeine plant, which will use tea wastes as raw material, has been set up in Jorhat in Assam. The plant is based on the technological knowhow and basic design engineering developed by the Regional Research Laboratory, Jorhat. Researchers in Assam have found a new source for commercial production of caffeine in the tea wastes found in the tea gardens of the State.

(Chemical Products Finder 9(2), 1990, 124)

#### 355 Pepsico Unit commissioned

The Rs. 22-crore processing facility, jointly promoted by Pepsico, Punjab Agro Industries Corporation and Voltas, has launched the operation with the processing of tomatoes into tomato paste. Its fruit and vegetable processing complex, which is Asia's largest one with a capacity to produce 600 tonne per day was commissioned at Zahura in Hoshiarpur. The plant has already received an order to export 4,000 tonne of tomato paste to the US. This is the second plant commissioned by Pepsi Foods this year. The plant has been commissioned seven months behind schedule.

(Chemical Products Finder 9(2), 1990, 134)











